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VETERINARY Medicine

Established 1905

features in this issue...

Disease and the Zoophilic Vector

Observations on the Course of Bovine Mastitis

Effect of Chlortetracycline Supplementation on the Incidence of Foot Rot and Feed Lot Performance in Cattle

Cysticercosis in Cattle

The History of Some Current Problems in Animal Disease VI. Hog Cholera

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[3]Lieberman, L.L.: J. Am. Vet. M.A., 125, 128, 1954
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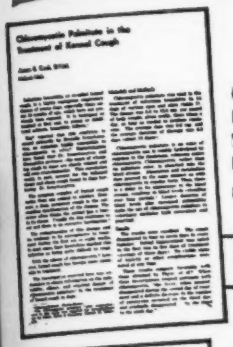

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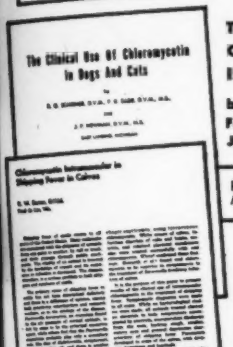

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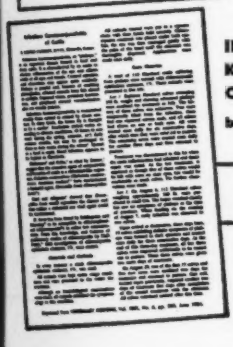

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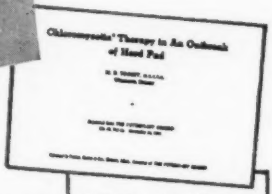

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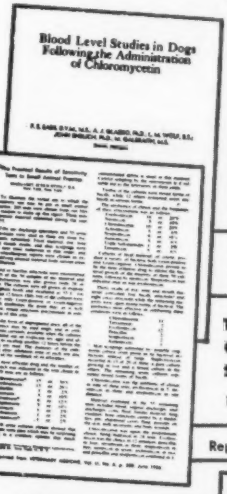

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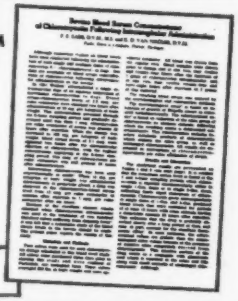

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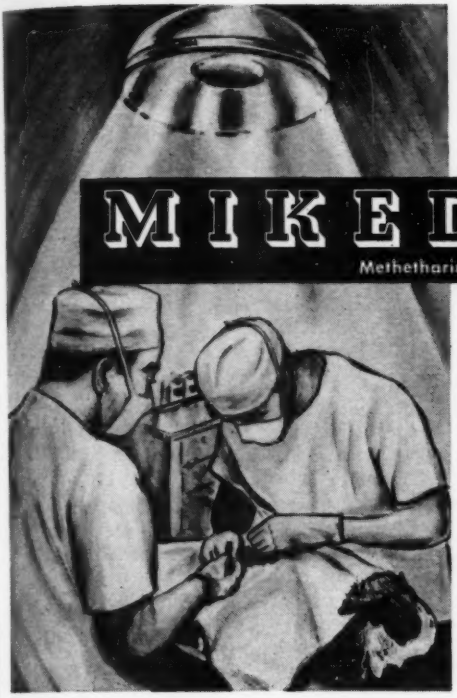

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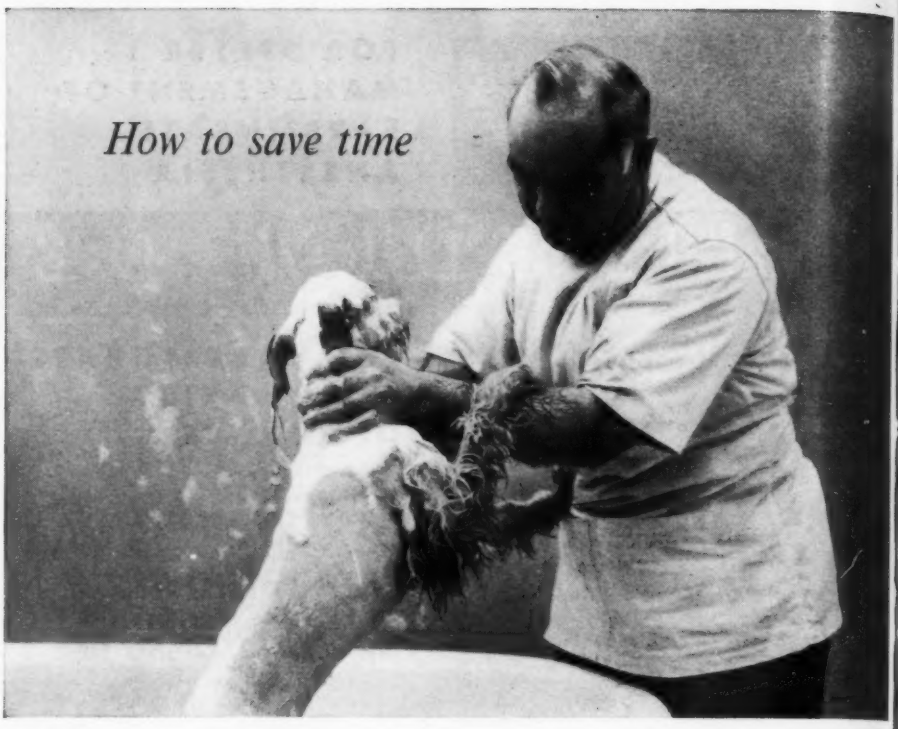

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Such conditions furnish optimum opportunity for many parasites, a portion of whose life cycles are independent of the host, which likely will contaminate pastures as infective larvae in greater concentrations than in any of the recent years.

Under dry conditions, development of infective parasites is limited and natural conditions hold serious infection at a minimum. Under the present conditions, a potential hazard of rather serious proportions exists now with the threat of increased losses due to parasites in all classes of domestic meat producing animals.

Practitioners are urged to acquaint themselves with the latest findings concerning control procedures and to consider advisability of suggesting to clients effective ways and means to avoid greater than normal, insidious losses likely to occur in the months ahead.

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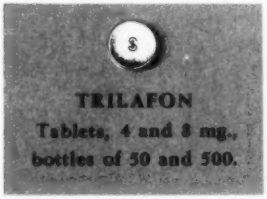

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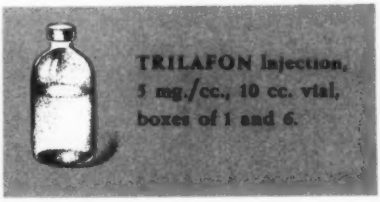

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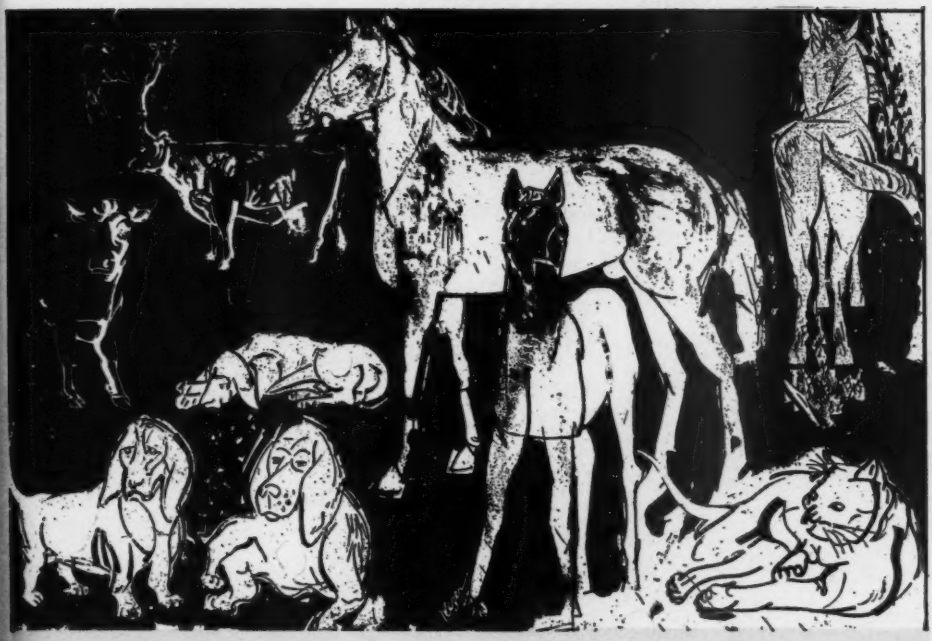

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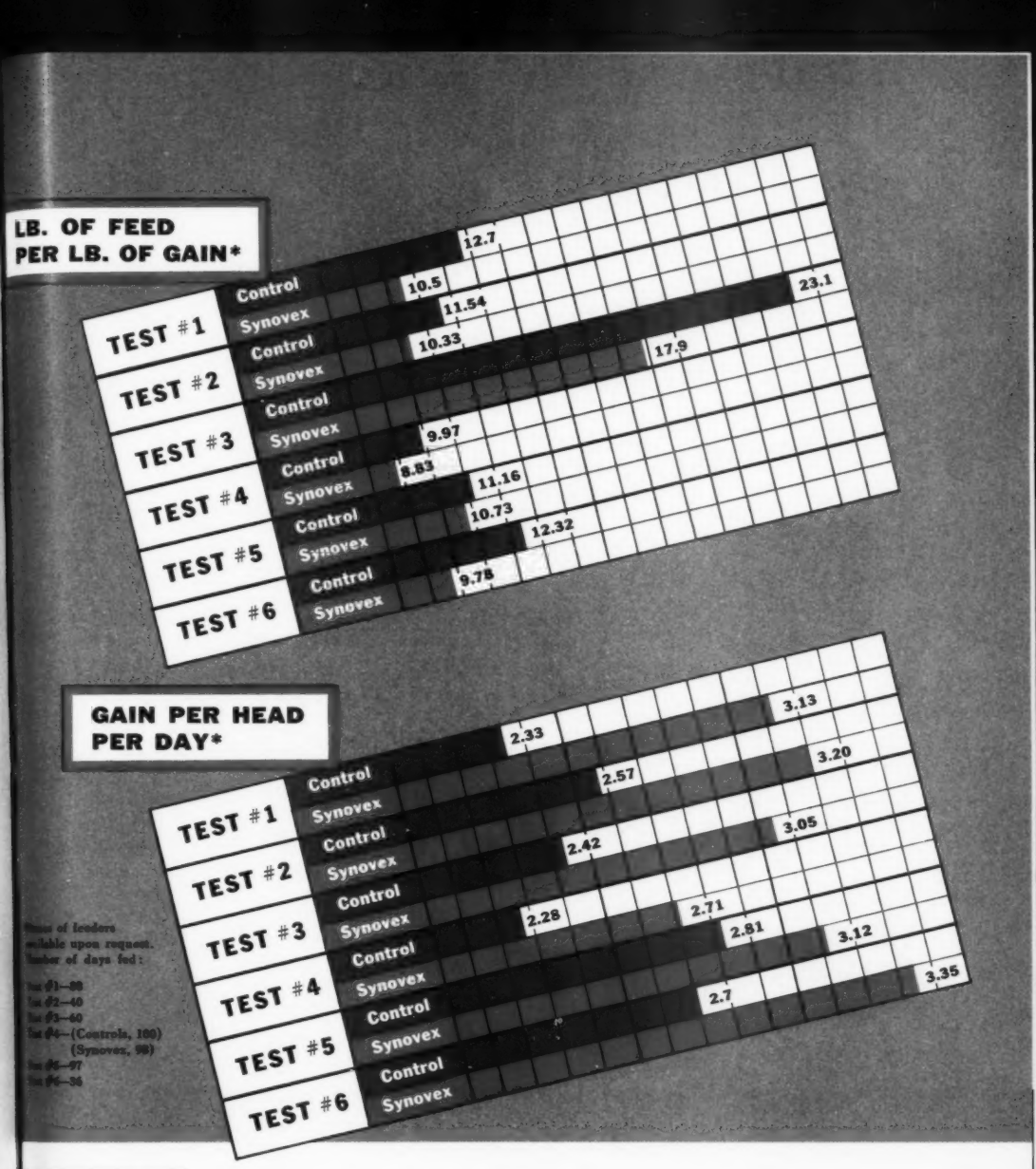

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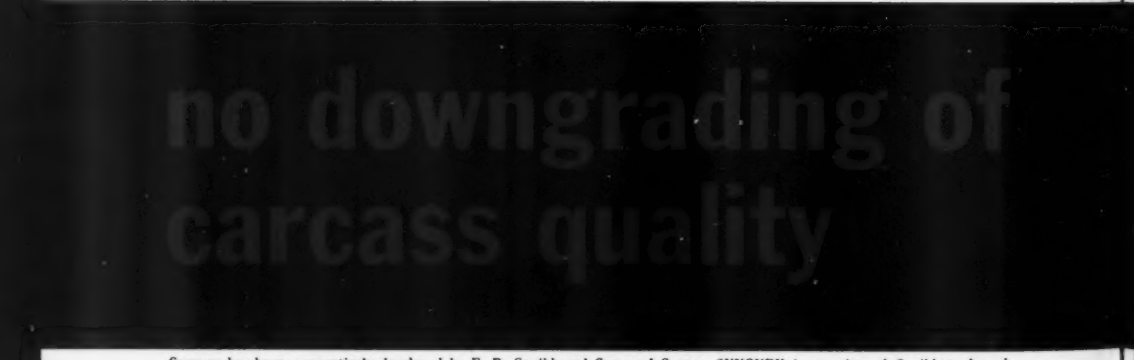

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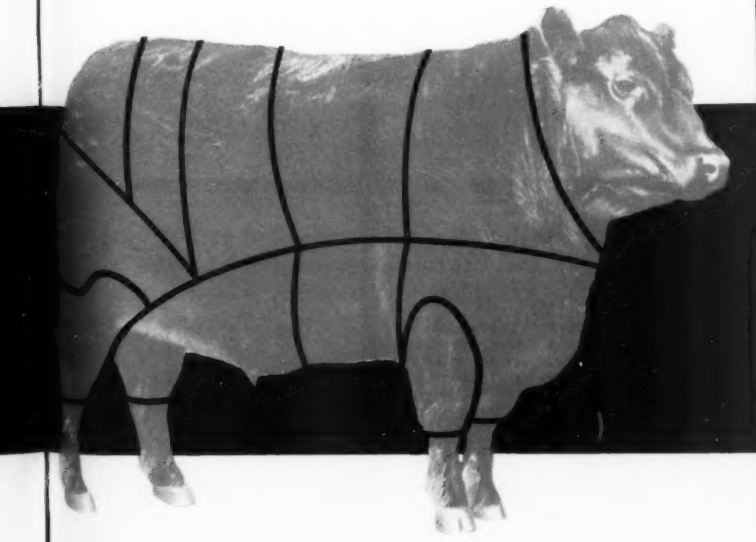
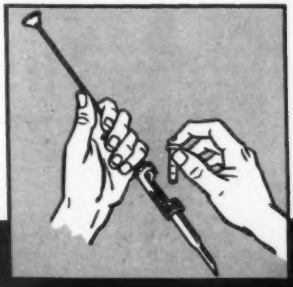


Insert plastic cartridge containing six pellets of Synovex into the shank of the implanter.



Nick through skin of ear with special scalpel, insert tip of implanter, press plunger to eject all 6 pellets of Synovex.

•R. J. Deans, W. J. Van Arsdell, E. P. Reineke and L. J. Bratzler (Michigan Agricultural Experiment Station): The Effect of Progesterone-Estradiol Implants and Stilbestrol Feeding on Feed Lot Performance and Carcass Characteristics of Steers, Journ. Animal Sci. 15:1020, 1956.

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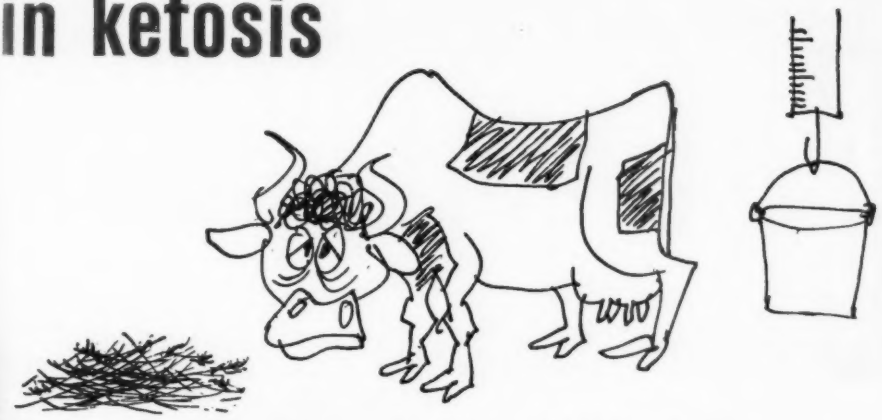

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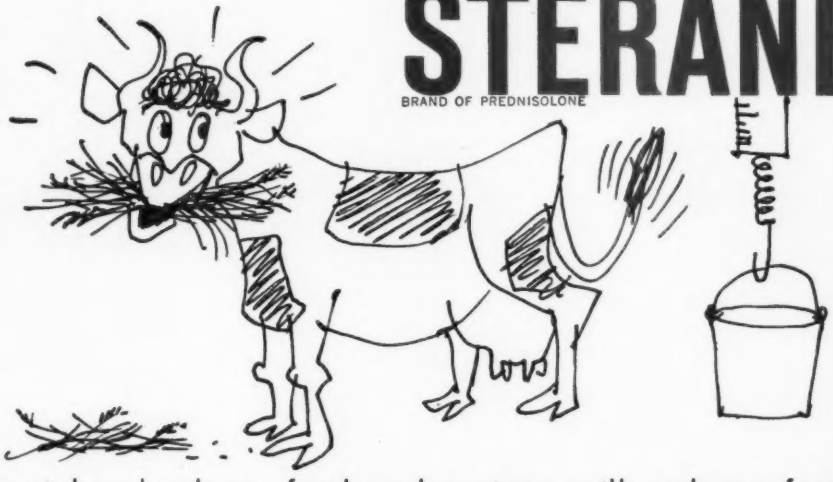

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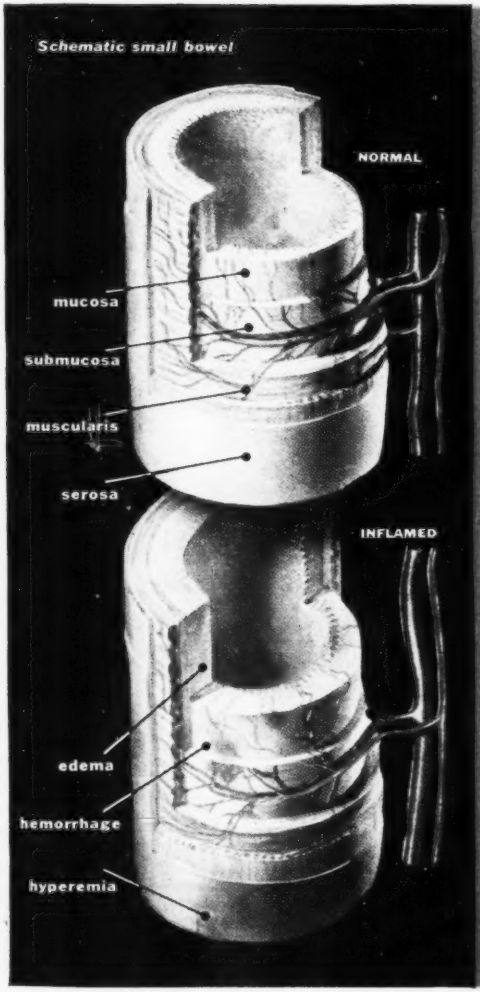

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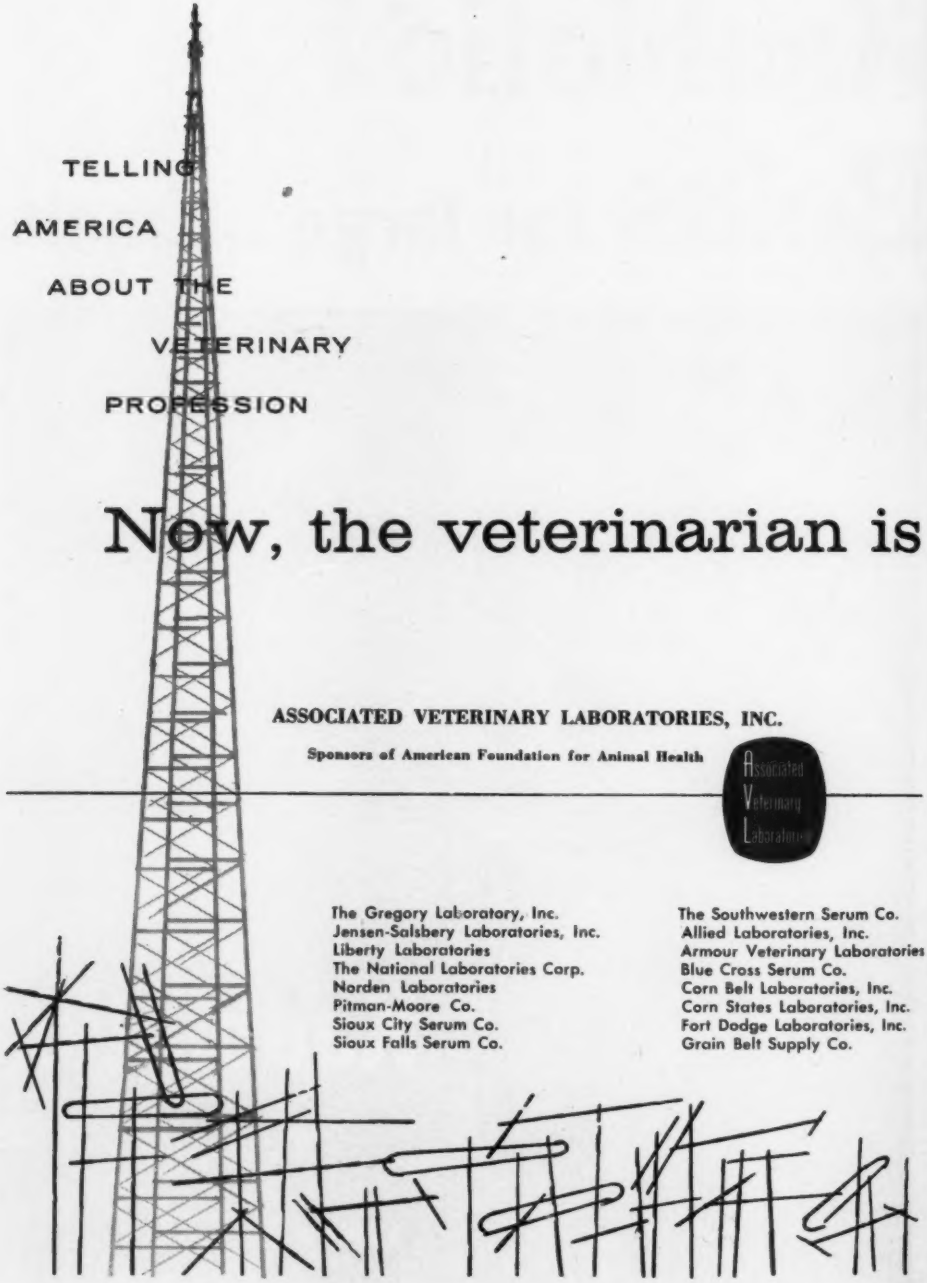

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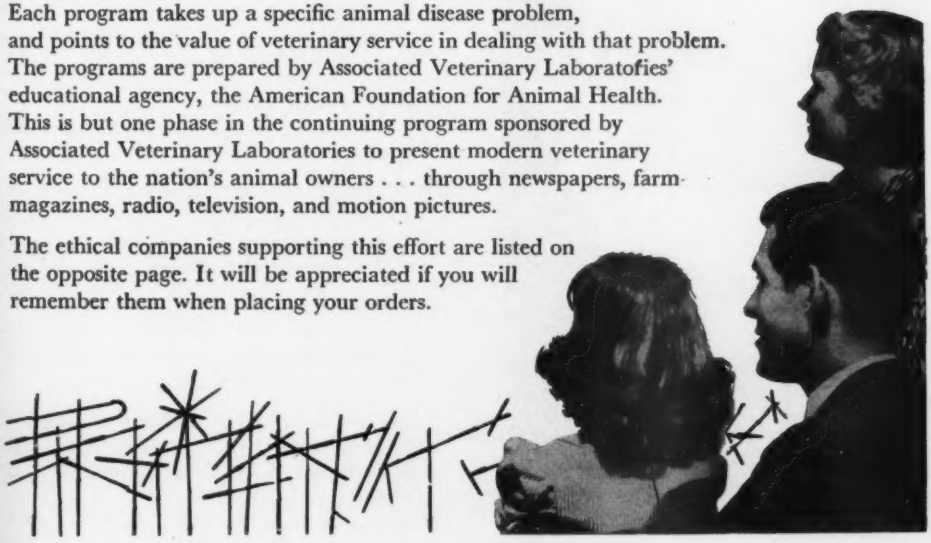

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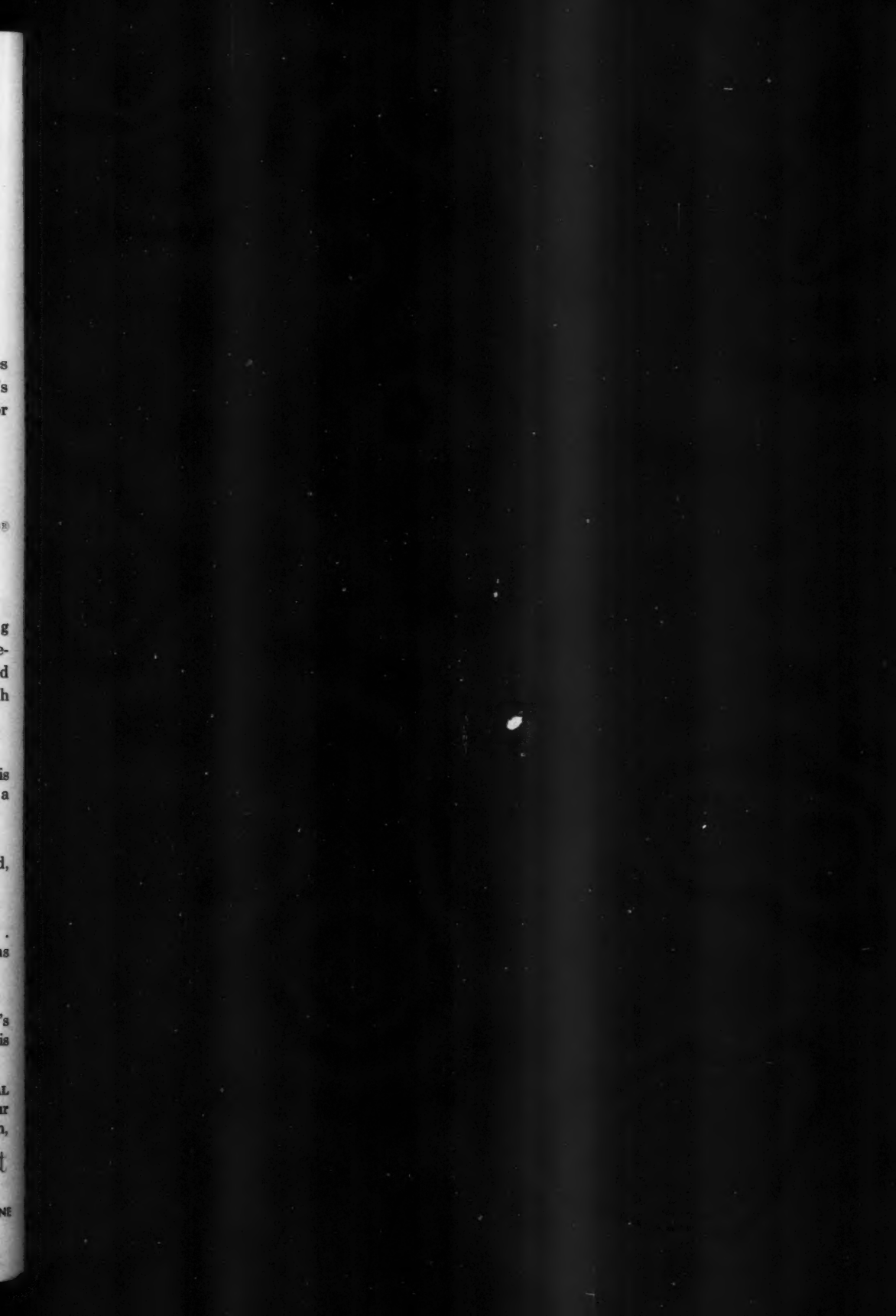

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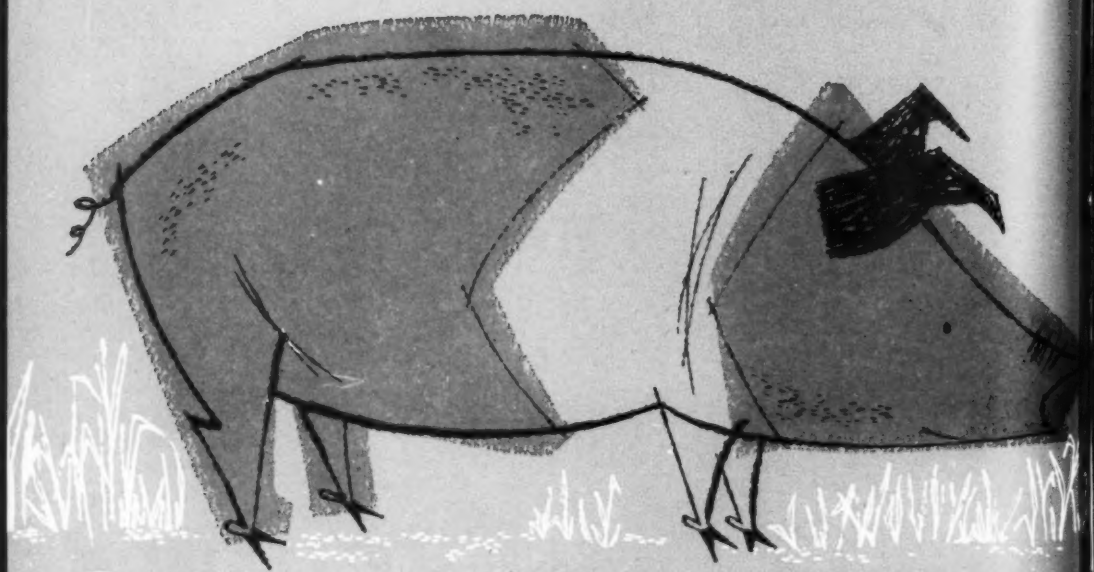

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Disease And The Zoophilic Vector†

VERNON J. TIPTON,* CAPT., M.S.C., St. Louis, Missouri

AS insects are the most numerous form of animal life on this planet, it seems consistent that they should play a correspondingly important role in the lives of those who are the stewards of the earth. These creatures have adapted themselves to every topographical and climatic condition on this globe. They have affected the destinies of man and the course of history. Perhaps no other form of animal life so fills every facet of our existence as do the insects. They are at once our friends and our enemies. In war they may place victory in our hand or wrench it from our grasp. They give us our sweetest food; cause us to take our bitterest pill. They feed upon man and he returns the compliment. They furnish us with love potions and with poisons. They give us our brightest lustres, our most intricate design, and reduce our buildings to rubble. They fill our fairy tales with delight and our history with sadness. They give us our fanciest silks and our holiest woolens. These are the insects — our intimate companions and our distant relatives.

Clausen[1] states, "Insects play such an important part in the economy of nature and in everyday experience that they have affected the welfare and the folklore of peoples all over the world." The antiquity of man's close association with insects is illustrated in the couplet, "Adam had 'em." And yet, his failure to recognize the relationship between insects and disease has compounded greatly the perplexities of his existence. Even now among primitive peoples there is a lack of appreciation for the importance of the insect and its role in their daily ailments. However, in modern times those insects living in close association with man have been given the notoriety due them and are being dealt with accordingly. It is a different group of insects — those not living in close proximity to man — that is the subject of the following comment.

Certain of these insects enjoy multiple-host relationships. That is, they will associate rather promiscuously with a number of animal hosts, including man. Other insect parasites are somewhat more discriminating and prefer a particular host but will feed on several hosts, depending on accessibility. Still other ectoparasites are bound by some inexorable need to associate with a particular animal species. This need may be based on common ecological requirements or it may be true host specificity dictated by the food requirements of the parasite. In times past, the host-specific or ecologically restricted zoophilic ectoparasite has not received a great deal of consideration in the epidemiology of diseases affecting mankind. Only recently has it become evident that we must appreciate the importance of studies which relate to the bionomics and systematics of insect parasites regarded as host-specific or ecologically restricted and not normally associated with man.

---

†Presented at the 65th annual convention of the Missouri Veterinary Medical Association, St. Louis, Feb. 15-17, 1957.

*Chief, Entomology Section, Fifth U. S. Army Medical Laboratory, 12th and Spruce Streets, St. Louis 2, Missouri.

Disease Classification

The classification of disease given by Gill[2] in his Genesis of Epidemics may help further to illustrate this point of view. Most infectious diseases will fit into one of the classes of disease proposed by Gill:

Class 1: Animal to animal (direct transmission).
Class 2: Animal to animal (via insect vector).
Class 3: Animal to man (via insect vector).
Class 4: Man to man (via insect vector).
Class 5: Man to man (direct transmission).

Classes 3, 4, and 5 are those which have received the greatest attention from epidemiologists in the past. More recently, however, it has become increasingly evident that a thorough knowledge of some of the factors operating in the class 2 category is necessary as a basis for prophylactic measures in the control of human disease.

Insects as Disease Vectors

Studies of yellow fever in South America, Central America, and Africa; plague in the western United States; and the viral encephalitides throughout the world, further indicate a need for basic research of the type mentioned above. Elton[3] states, "Until recently, it was believed that the epidemiology and bionomics of yellow fever were simple. The virus was transmitted from man to man by the mosquito, *Aedes aegypti*. But, in 1932, there was an outbreak of yellow fever in an area of Brazil where no *Aedes aegypti* could be found." More recent investigations indicate there are three epidemiological patterns; a South American sylvan pattern and African sylvan and urban patterns.

The African sylvan pattern has two cycles. First, there is an arboreal monkey involved, which spends most of its life in the trees of the tropical rain forest. The virus is transmitted from monkey to monkey by a mosquito, *Aedes africanus*, which is isolated ecologically — that is, it lives in the trees at a 40-50 foot level where most of the feeding is done at night. This species breeds in the rot-holes in the trees. This species was considered to be insignificant in the epidemiology of yellow fever because it is a "wild mosquito" and rarely comes into contact with man. If we stretch a point a little and consider sylvan yellow fever as a disease entity, then it will fit into the class 2 category of Gill. Man has no direct contact with this cycle. However, in the second cycle another species of monkey is involved, as well as another species of mosquito less restricted ecologically than the first. At night the red-tail monkey (*Cercopithecus nichitans mpangee)* is an inhabitant of the forest canopy where it is also fed upon by *Aedes africanus* and thus becomes infected with yellow fever. During the daytime this monkey feeds in the plantations, thus carrying the virus with it to an area inhabited by man. The second mosquito, *Aedes simpsoni,* feeds on these monkeys and carries the virus to man. They are good vectors because they breed in the plants of the plantation and prefer the blood of man to any other host. Man then carries the virus back to his dwellings where the urban cycle is active, with *A. aegypti* as the vector.

There appears to be only one cycle in the sylvan yellow fever of South America. The virus is transmitted among the monkeys in the upper tree canopy by mosquitoes of the genus Haemagogus. When trees are felled in the forest, the mosquitoes come down with the trees and man is brought into contact with this reservoir. He then returns to the village carrying the virus with him and it is then that the domestic mosquito, *Aedes aegypti,* perpetuates the urban cycle.

Plague

The discovery of plague in San Francisco in 1900 was thought to be occasioned by the arrival of infected rats on ships from the Orient. Mitzmain[4] was rather emphatic in his announcement that "Rats from the Orient are no doubt responsible for its introduction into San Francisco." Later, so it was surmised, fleas from these introduced rats infected ground squirrels and other indigenous rodents, thus introducing sylvatic plague in the west. This view was generally accepted during the next few decades, even though mammalogists indicated that the reverse might be true — that is, plague existed in an endemic form among the indigenous rodents and was carried to rats via squirrel fleas. Conclusive evidence that plague may be spread from indigenous rodents to rats of the genus Rattus was not forthcoming until Meyer and Holdenreid[5] discovered a plague focus in a colony of rats living in close proximity to a colony of squirrels. This focus was of particular significance in view of the absence of the rat flea, *Xenopsylla cheopis,* and the presence of indigenous fleas.

Allred[6] has listed 65 species and subspecies of rodents and lagomorphs from which plague bacilli have been isolated. He also lists over

45 species and subspecies of fleas parasitic on these rodents which have been implicated in plague transmission. Most species of this group are zoophilic and have contact with man in but a few rare instances. Nonetheless, these fleas which do not live in close association with man because of a host specificity or other ecological restriction play a very important role in the epidemiology of plague in the west.

Encephalitides

The third disease group cited for the purpose of illustration may not be as well defined as the previous two, but is more appropriate since it involves domestic animals. Reports of arthropod-borne encephalitides throughout the world have become increasingly commonplace. Among them, Japanese "B" encephalitis, eastern equine encephalitis, western equine encephalitis, St. Louis encephalitis, louping ill, and Murray Valley fever are perhaps the best known of this group, although there are other closely related viral agents which are receiving more attention each day. For the most part, the etiological agent of these diseases is transmitted by the proboscis-banded mosquitoes of the genus Culex. The genera Aedes and Mansonia and the tick genus Ixodes may also act as vectors of these viral agents. The known reservoirs of these viruses include many of our domestic animals and several species of wild birds and mammals. I think it will be sufficient for our purposes to say that some of these viruses have been isolated from mites a number of times, and less frequently from insects such as lice and kissing bugs (Triatoma). There yet remains much basic research in order to fully assess the role of these arthropods in the epidemiology of the encephalitides. However, it is clear that zoophilic arthropods are again involved in the perpetuation of disease of great importance to man.

Discussion

In conclusion, we note that the spread of yellow fever northward through Central America toward Mexico and the southern United States is being accomplished by a group of zoophilic mosquitoes of the genus Haemagogus. Plague in the western states is being perpetuated by a group of zoophilic fleas, and it appears that certain other zoophilic arthropods are perpetuating the encephalitides among wild and domestic mammals and birds.

It can be seen from these examples that there are factors at play in the natural history of disease which are more basic than the reservoir-vector-man chain. Epizootics occurring among animal populations have long been the subject of much speculation but little basic research. The reason for our need for a greater understanding of the diseases of animals is twofold.

First, the complex factors promoting host specificity are not well understood. We know little of the physiological needs of those insects which are best suited to be vectors of disease. We know little of the micro habitat in which they live. It would be presumptuous for us to assume that those conditions which produce host specificity are irreversible. A few years ago, a new disease entity was discovered in New York City and was given the name of rickettsial pox. The vector of this disease was found to be *Allodermanyssus sanguineus*, a mite which normally parasitizes small rodents. Certain conditions in an apartment house in New York City brought this mite into contact with man. There ensued an outbreak of a disease of unknown etiology and epidemiology until someone recognized the possibility of a normally zoophilic organism becoming less restricted in its feeding habits. An unknown factor had thus rendered a class 2 disease of significance to man.

Secondly, we are unable to anticipate fully the new situations of environment man will be subjected to in the future. His conquest of new unpopulated regions may introduce entirely new problems in vector-host relationships. In the recent past our troops in Korea encountered a particular environment which produced a disease which is now known as haemorrhagic fever. This may be a vector-borne disease requiring unusual conditions to bring into contact a susceptible host and an efficient vector.

It becomes apparent that diseases of animals is a field of research deserving of intensive basic work. A work in which a synthesis of educational backgrounds would bring together the entomologist and the virologist, the bacteriologist and the veterinarian, the immunologist and the epidemiologist, as well as the comparative pathologist. Such teams, working together harmoniously, may furnish the answers to some of our most perplexing problems much in the same manner that Smith and Kilbourne and colleagues discovered the key to the transmission of Texas cattle fever. Indeed, the Army veterinarian and Army entomologist have combined talents in studies of such diseases as scrub typhus, haemorrhagic fever and Japanese "B" encephalitis, and so in a measure have contributed to that fund of knowledge called "medical science."

Thus insects do play "an important role in the economy of nature." The intimacies of their lives are still a fascinating study, as they were in the days of Fabre, the French entomologist.

But of greater significance and of still greater fascination are the secrets of disease transmission which they have hidden so well from the unsuspecting.

REFERENCES

1. Clausen, Lucy W., Insect Fact and Folklore. The Macmillan Co., New York. 194 pp., 1954.
2. Gill, C. A., The Genesis of Epidemics and the Natural History of Disease. Balliere, Tindall and Cox, London. 550 pp., 1928.
3. Elton, Norman W., Contemporary Yellow Fever in Middle America. The Analyst. (First Army Area Medical Laboratory, New York, N. Y.) Bimonthly issues from 30 April to 31 December. 33 pp., 1956.
4. Mitzmain, M. B., Insect Transmission of Bubonic Plague: A Study of the San Francisco Epidemic. *Ent. News.*, 19:353, 1908.
5. Meyer, Karl F. and Holdenried, R., Rodents and Fleas in a Plague Epizootic in a Rural Area of California. *Puerto Rico Jour. Public Health and Trop. Med.*, 24:201, 1949.
6. Allred Dorald M., Plague Important Fleas and Mammals in Utah and the Western United States. *The Great Basin Naturalist.* 12:67, 1952.

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Antibiotics in Foods

In his concluding statements before the combined sections on Poultry and Public Health at the 93rd annual meeting, A.V.M.A., San Antonio, Tex., Oct. 15-19, 1956, Dr. Charles G. Durbin (*Jour. Am. Vet. Med. Assn.*, 130:280 [Apr. 1], 1957) stated that "Although there are glowing reports of the advantages to be realized from the use of antibiotics, it is well to sound again a note of caution. Regulatory officials in the United States believe their safety has not been established for most of the proposed uses. The status of antibiotics in food in the United States is that (1) they may be used when no residues remain in the food, (2) when residues remain in the uncooked food provided the food is always cooked and that cooking always destroys the antibiotics (and provided the residues in the uncooked product are within an official tolerance) and that (3) they are being considered for uses in which there will be some of the antibiotic in the food as it is eaten. Their safety under these conditions has not been established."

▼ ▼ ▼

Nothing helps the livestock industry as much as carefully documented research.—*Robert Graham, D.V.M.*

Cattle Fever Ticks

Florida inspectors discovered a few cattle ticks *(Boophilus microphus)* on stock at the Okeechobee Livestock Market this spring and immediately placed a quarantine over 100 ranches in 10 counties where infestation was likely to occur.

To date, cattle on a total of four premises adjoining the home place of tick infested cattle, and two ranches in adjacent counties have been found infested. Experienced state and federal inspectors have been assigned to a project of prompt eradication. More than 30 employees are already engaged for the detailed work.

The last outbreak of cattle fever ticks in Florida was found in the winter of 1945. Since that time, cattle passing through all auctions throughout the state have been inspected routinely and all cattle except those selling for slaughter also have been dipped.

Florida was the last state, with the exception of Texas (where a narrow buffer zone along the international border is still infested) to be freed of fever ticks. The last federal quarantine was lifted in 1943. Deer, which also served as hosts for the tropical tick, delayed the final eradication efforts in difficult wild areas, and it was only after the Florida legislature provided proper authority to eliminate the southern deer that the vectors were finally eliminated. More than 20,000 deer were slaughtered to accomplish this end.

Danger of reinfestation in Florida is constantly present because of the close proximity to tick infested countries and islands of the West Indies with which the state is engaged in active commerce.

▼ ▼ ▼

Positive Blood Titers to *L. Pomona*

Of over 3,000 herds of cattle tested by University of Wisconsin laboratories, 830 herds were revealed to be serologically positive to *Leptospira pomona* antigen. Approximately 4,600 positive individual cattle samples were found among 14,000 blood samples submitted for test and diagnosis. Of herds tested, 34% (33% of cattle) gave positive reaction for *L. pomona.*

In discussion of the disease, Krohn (*Vet. Sci. News*, Spg. 1957) comments on the probable lengthy period cattle may carry positive titers, although animals remain symptom free.

Observations On The Course Of Bovine Mastitis Following Intramuscular Injection Of Meticorten And Penicillin

E. J. FOLEY,* Lafayette, New Jersey

DURING the course of studies on the effect of intramammary infusion of prednisone (meticorten)† on infected bovine udders, it was observed that marked reduction in inflammation occurred following intramuscular injection of meticorten aqueous suspension, veterinary. The influence of dosage was studied, and the work was expanded to include detailed observations on a product which contained 3,000,000 units of procaine penicillin G, and 100 mg. of prednisone (meticillin).** This paper describes the results obtained in udder infections of lactating cows using intramuscular injections of meticillin alone, and in conjunction with intramammary instillation of metibiotic.***

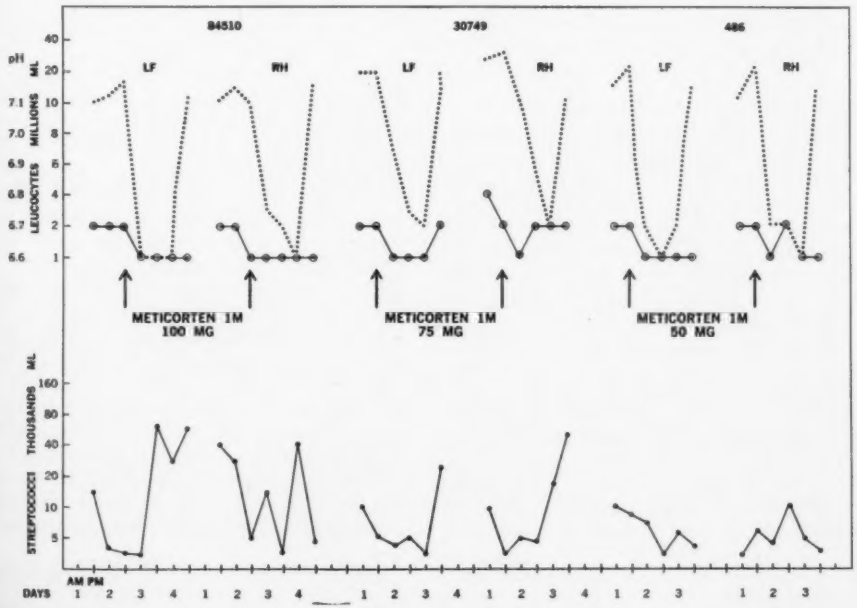
*Umbrian Farms Research Laboratories.
†Meticorten is the trade name of Schering Corporation for prednisone.
**Meticillin is the trade name of Schering Corporation for prednisone-penicillin injection.
***Metibiotic is the trade name of Schering Corporation for the prednisone acetate-penicillin-streptomycin combination for the treatment of mastitis.

Materials and Methods

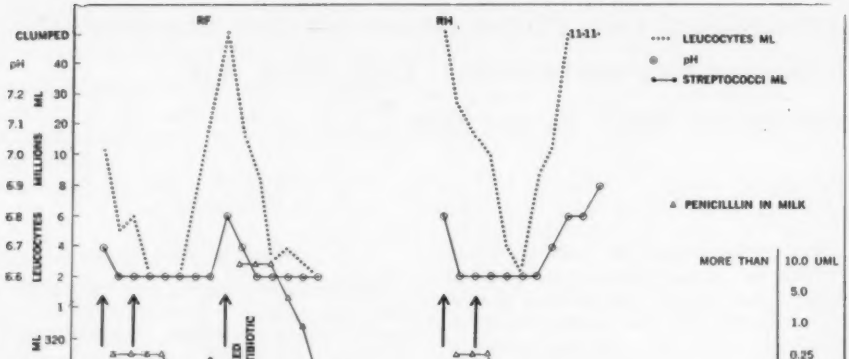
The methods used for examining milk samples were similar to those described in studies on the effect of treating infected udders by instilling metibiotic.[1] Briefly, "fore milk" samples (approximately 20 ml.) were obtained twice a day at the regular (12 hour) milking intervals. Leukocyte counts and pH determinations were made on all samples, and bacteria counts were obtained by culturing in tryptose agar.

Effect of Intramuscular Injections of Meticorten on Inflammation of Quarters Infected with Streptococcus agalactiae. Graph I illustrates the lowering of leukocyte count and the fall in pH values seen in quarters of cows infected with *Strep. agalactiae* following intramuscular injection of meticorten. It will be noted that this anti-inflammatory effect occurred in the face of continuing streptococcus infections. Of particular interest is the prompt drop in leukocytes, within 12 hours after in-

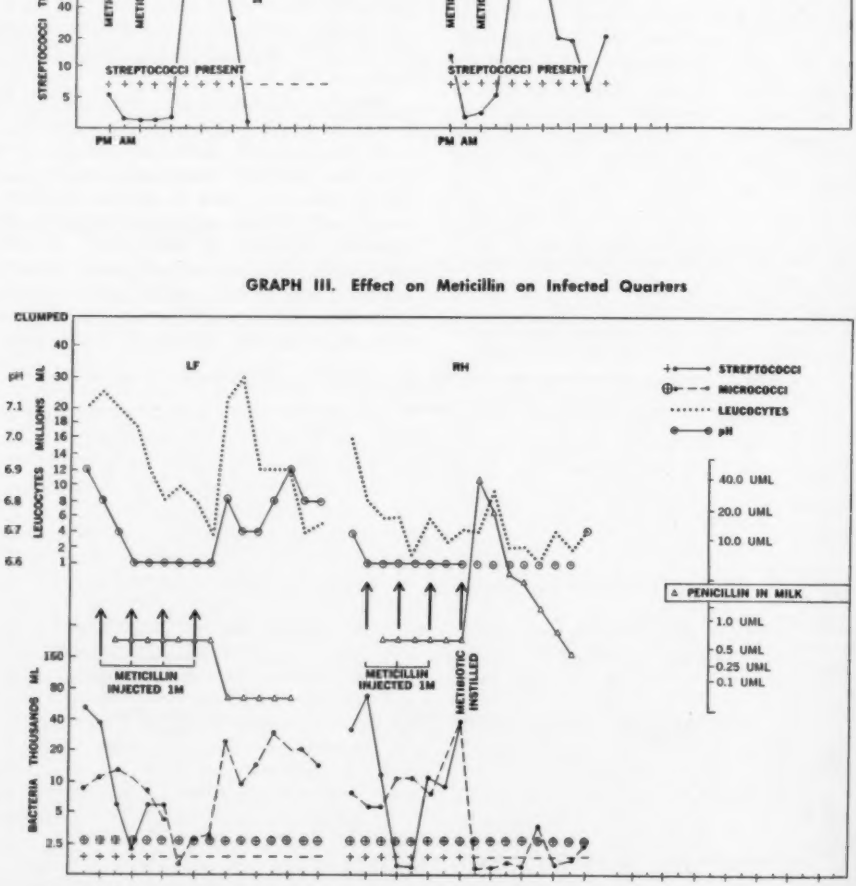
GRAPH I. Influence of Intramuscular Injection of Meticorten on Inflammation in Infected Quarters



GRAPH II. Effect of Meticillin Streptococcus Infected Quarters



GRAPH III. Effect on Meticillin on Infected Quarters



jection. It would appear that anti-inflammatory effect persisted for 36 hours with each of the three doses administered. It is presumed that the sharp increase in leukocytes during the 36-48 hour milking interval following injection indicates exhaustion of the anti-inflammatory action.

Effect of Injection of Meticorten with Penicillin (Meticillin) on the Course of Infection in Quarters Infected with Strep. agalactiae. Experiments showing the influence of meticillin on leukocytosis and on the streptococcal population of infected quarters is illustrated in graph II. It is seen that the first intramuscular injection of the combination induced a sharp drop in leukocytes and streptococci within 12 hours, and the second injection 24 hours after the first, further decreased the number of leukocytes. Infection was not eradicated, however, and 36 hours after the last injection leukocyte count mounted sharply. This followed 12 hours after the streptococcal population again had reached a high level. This increase in streptococci began promptly when the level of penicillin in the milk decreased, between 24 to 36 hours after the last injection. Thus, under the conditions of this experiment, the amount of penicillin present in the milk following two intramuscular injections was sufficient to reduce and hold the streptococci at a low level for 48 hours, but not to eradicate them. The strains of *Strep. agalactiae* causing these infections were shown by appropriate tests to be of normal sensitivity to penicillin.[3] It will be seen that the right fore quarter of this cow was successfully treated by udder instillation of metibiotic.

A similar experiment is shown in graph III. The cow involved had a mixed infection caused by *Strep. agalactiae* and an unidentified micrococcus in the left fore and right hind quarters. The streptococci were of normal sensitivity to penicillin and streptomycin. The micrococci were resistant to one unit of penicillin but susceptible to ten units, and were resistant to more than ten units of streptomycin. After intramuscular injection of meticillin, leukocytosis decreased and pH dropped in the infected quarters, and the streptococcal populations declined sharply. The micrococcial populations were depressed to a lesser extent. Three additional intramuscular injections were given at 24 hour intervals. During this time, the number of leukocytes was diminished, and penicillin was detectable in the milk. Streptococci disappeared from the left fore quarter but micrococci remained; in the right hind quarter, both streptococci and micrococci persisted. The streptococcus infection in the right hind quarter was eradicated by instillation of metibiotic.

Graph IV illustrates the anti-inflammatory and antibacterial action of a single injection of meticillin in an acute streptococcal infection and shows that cure resulted following a subsequent single instillation of metibiotic.

Discussion

The data clearly reveal pronounced anti-inflammatory action of meticorten in infected lactating udders. This suggests that the use of this steroid together with large doses of penicillin by intramuscular injection is rational therapy as adjunctive treatment for acute cases of mastitis caused by penicillin sensitive bacteria. Repeated injections spaced at 24-hour intervals suppress inflammation and maintain sufficient amounts of penicillin in the milk to drop streptococcal populations to minimum levels. Streptococci may be eradicated if daily injections of meticillin are continued for four or more days.

These results are in keeping with those described by Welsh, *et al.*,[3] Murphy and Stuart,[4] Tucker and Fuller,[5] and Randall, *et al.*[6] All of these authors have demonstrated the presence of penicillin in milk of lactating cows following parenteral injection.

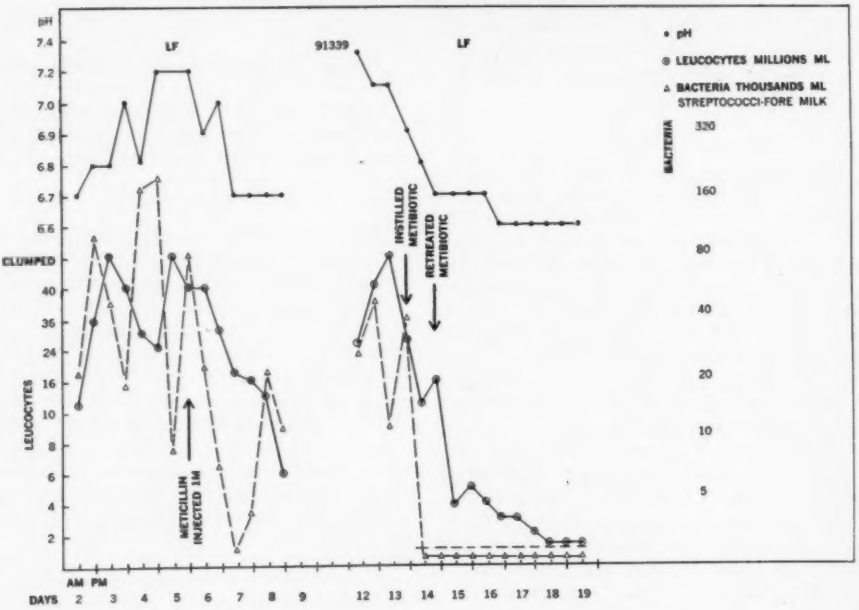
Cure of *Strep. agalactiae* infection has been demonstrated following repeated parenteral injections of massive doses of penicillin by Murphy and Stuart[4] and by Tucker and Fuller.[5] These authors have discussed the feasibility of treating streptococcus mastitis by parenteral injection of penicillin.

On the basis of present results, a rational approach to treatment would be to inject meticillin and to instill metibiotic 12 or 24 hours later. This type of therapy would be indicated particularly in acute cases in which swelling is severe. That this type of therapy is effective has been demonstrated repeatedly during the course of this work. The type of response obtained is illustrated in graph IV.

Summary

Experiments reported in this paper show that meticorten, when injected intramuscularly in sufficient doses, has a pronounced anti-inflammatory action on the infected bovine udder. It has been shown also that concommitant intramuscular use of meticorten and penicillin (meticillin) is useful adjunctive

GRAPH IV. Influence of Meticillin Injected Intramuscularly on *S. agalactiae* Injection and Cure Following Instillation of Metibiotic



therapy in bovine mastitis. Therefore, on the basis of these studies, and others reported elsewhere, a method involving the concommitant use of intramuscular meticillin and the intramammary instillation of metibiotic in cases with acute manifestations of mastitis is recommended.

REFERENCES

1. Foley, E. J., Studies on an Anti-Inflammatory-Antibiotic Preparation for the Treatment of Bovine Mastitis. In press.

2. Foley, E. J., Lee, S. W., and Epstein, J. A., Effect of Penicillin on Staphylococci and Streptococci Commonly Associated with Bovine Mastitis. *Jour. Milk Technol.*, 8:129, 1945.

3. Welsh, M., Langer, P. H., Burkhart, R. L. and Schroeder, C. R., Penicillin Blood and Milk Concentrations in the Normal Cow Following Parenteral Administration. *Science*, 108:185, 1948.

4. Murphy, J. M., and Stuart, O. M., The Treatment of *Streptococcus agalactiae* Infection of the Bovine Udder by the Intramuscular Administration of Penicillin. *Cornell Vet.*, 44:139, 1954.

5. Tucker, E. W., and Fuller, R. W., Blood and Milk Levels Following Intramuscular Injection of Dibenzylamine Penicillin G and the Effect of *Streptococcus agalactiae* Infection of the Bovine Udder. Antibiotics Annual 1953-1954, p. 433, Medical Encyclopedia, Inc., New York, N. Y.

6. Randall, W. A., Durbin, C. G., Wilner, J., and Collins, J. H., Antibiotic Concentration and Duration in Animal Tissue and Blood Fluids. I. Blood Serum and Milk of Cows. Antibiotics Annual 1953-1954, p. 421, Medical Encyclopedia, Inc., New York, N. Y.

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Tuberculosis Test Sensitivity

In a discussion by a veterinarian having extensive experience relative to tests for tuberculosis in cattle, the members of his audience were again reminded that the so-called "cervical test" (Stormont test) may be applied only under federal or state supervision, or by authority from such a source. Since this is a highly sensitive test, its promiscuous unauthorized use would doubtless result in confusion in retests of suspected herds or animals. Concerning the intradermal test applied in the caudal fold, owners and attendants are cautioned not to subject the injected area to digital manipulations. If curiosity can not otherwise be curbed, careful lifting of the tail for visual observation only is permissable.—*R. R. Dykstra, D.V.M.*

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Everybody's Poultry Magazine estimates that 100,000,000 lb. of chicken will be used in frozen chicken pies this year.

The Effect Of Chlortetracycline Supplementation On The Incidence Of Foot Rot And Feed Lot Performance In Cattle

W. P. JOHNSON,* D.V.M., J. ALGEO,** M.S., and J. KLECK,** D.V.M.,
Pearl River, New York, and Santa Maria, California

INCREASE in growth rate, decrease in intestinal disturbances, and reduced morbidity and mortality have been observed in calves and mature cattle of both dairy and beef breeds that have been fed chlortetracycline† at various levels for varying periods.[1-13] Many theories have been advanced to explain the mechanism responsible for the growth effect of antibiotics. It now appears that elimination of low grade infections, which are often not apparent, is accomplished by antibiotic feeding, and improved health results.

Since animals maintained in feed lots are subject to potential disease hazards due to exposure to disease in shipment and the stresses inherent in commercial fattening operations, the possibility of group prophylaxis and treatment through incorporation of antibiotics in the feed during the conditioning period was suggested. The study reported here was designed to investigate the effect of chlortetracycline at high levels in the ration of beef cattle during the first 28 days of the feeding period, followed by a lower level fed continuously for the remainder of the feeding period. The effect was determined by weight gains and the number of animals requiring treatment for disease.

*Director, Ruminant Development, American Cyanamid Company.
**Nutritionist (Algeo) Sinton & Brown Company and Veterinarian (Kleck).
†Trademark of American Cyanamid Company for the antibiotic, chlortetracyline, is aureomycin.

TABLE 1. Complete Basal Ration

	Lb./head
Alfalfa hay	6.20
Molasses dried beet pulp	3.10
Almond hull meal	2.30
Wheat mill run	1.50
Molasses	0.75
Barley	9.00
Fat	0.40
Dried prunes	0.75
Total	24.00

Plus salt, minerals, and diethylstilbestrol (10 mg./head/day)

Materials and Methods

A total of 1,365 yearling Hereford steers, averaging 660 lb., were purchased from a ranch near Las Vegas, N. M., and shipped by rail to the feed lot at Betteravia, Calif. The cattle had been grazed on the same ranch for approximately 11 months prior to purchase. They were divided by random selection into two groups, and each group was again divided into two groups, one to receive antibiotic-supplemented feed and the other the basal ration without supplementation.

The basal ration is indicated in table 1. Diethylstilbestrol was incorporated in the ration in sufficient quantity to provide 10 mg. per

TABLE 2. Weights and Average Daily Gains in Feed-Lot Steers

	Group 1		Group 2		Avg. combined replicated groups	
	Control	Chlortet.*	Control	Chlortet.*	Control	Chlortet.*
No. steers	315	316	366	368	681	684
Average starting weight (lb.)	655	654	668	665	661	659
Average weight (lb.) — 62 day	864	884	849	870	856	877
— 118 day	986	1,007	982	1,006	984	1,006
Average daily gain (lb.)						
0 — 62 day	3.32	3.65	2.97	3.36	3.15	3.52
63 — 118 day	2.14	2.16	2.38	2.43	2.29	2.30
0 — 118 day	2.76	2.94	2.68	2.91	2.74	2.94
Average daily gain above controls	—	+0.18	—	+0.23	—	+0.20

*Chlortet. = chlortetracyline — 500 mg./head/day for 28 days; 75 mg./head/day for 92 days.

TABLE 3. Number of Feed-Lot Cattle Treated — All Causes

	Group 1		Group 2		Combined replicated groups	
	Control	Chlortet.	Control	Chlortet.	Control	Chlortet.
Number of animals	315	316	366	368	681	684
Number treated — all causes						
0 — 118 day	95	18	145	18	240	36
0 — 30 day	12	6	11	6	23	12
31 — 60 day	10	8	19	6	29	14
61 — 90 day	2	1	4	5	6	6
91 — 118 day	71	3	103	2	182	4
Number treated — foot rot						
91 — 118 day period	69	0	103	2	172	2
Number treated — other than foot rot						
0 — 118 day	26	18	42	16	68	34

Chlortet. = Chlorteracycline.

TABLE 4. Incidence of Disease in Feed-Lot Cattle

	Group 1		Group 2		Combined replicated groups	
	Control	Chlortet.	Control	Chlortet.	Control	Chlortet.
Number cattle	315	316	366	368	681	684
Pneumonia	9	3	4	1	13	4
Shipping fever	7	11	19	8	26	19
Tracheitis (necrotic laryngitis)	3	1	7	0	10	1
Listerellosis	1	0	0	0	1	0
Foot rot	69	0	103	2	172	2
Photosensitization	0	0	1	0	1	0
Encephalitis (nonspecific)	0	0	0	1	0	1
Digestive disturbances	1	0	3	2	4	2
Not determined	5	3	8	4	13	7
Liver condemnation at slaughter					23	20

Chlortet. = Chlortetracycline.

head per day. Aurofac,® a feed supplement, containing 1.8 gm. chlortetracycline per lb., was added to the basal ration at the rate of 500 mg. chlortetracycline per head per day for the first 28 days, and 75 mg. per head per day for the remaining 90 days of the feeding period.

The steers were weighed on arrival at the feed lots, at 62 days, and again immediately before market. Feed consumption records were not kept. All cattle becoming ill were removed for diagnosis and treatment. Specific treatments applied and outcome will not be included here as the purpose of the experiment was solely to determine the necessity for additional treatment in the presence of levels of chlortetracycline in the feed continuously as compared with controls. Liver condemnations were recorded, but no other slaughter data were available.

Results and Discussion

As shown in table 2, improvement in average weight gains resulted from chlortetracycline supplementation under the conditions of this experiment. The average final weight of steers receiving supplemented feed was 2.2% more than the average final weight of the controls, and average daily gains were increased by 0.2 lb. over the entire feeding period.

The numbers of cattle requiring treatment are shown in table 3, and the specific diseases noted and incidence in table 4. The difference between the control and supplemented groups in numbers of animals requiring treatment for all causes was highly significant.

During the 91- to 118-day period, an outbreak of foot rot occurred. A total of 172 control animals were affected in comparison with

Extensive feeding operations in southern California are depicted here illustrating conditions under which field investigations were conducted.

®American Cyanamid Co., Pearl River, N. Y.

only two in the chlortetracycline-supplemented groups. In order to determine whether or not some mechanical factor and/or challenge mechanism might be present in the pens, certain of the pen locations were reversed. Even under these conditions, there were no further cases of foot rot in the supplemented groups, and it was therefore concluded that the highly significant reduction in incidence was due to the chlortetracycline intake.

Analysis revealed a significant reduction in the incidence of tracheitis, and indicated a trend to the reduction of pneumonia. Although the incidence of shipping fever and liver condemnations at slaughter were less in supplemented groups than in the control groups, these differences were not significant.

Summary

A study was conducted with 1,365 yearling steers to determine the effect of chlortetracycline supplementation on disease under commercial feed-lot conditions. The cattle were divided into four groups. Two groups, totaling 681 animals, were fed a basal ration only, and two groups, totaling 684, received the basal ration supplemented with 500 mg. of chlortetracycline per head per day for 28 days and 75 mg. per head per day for 90 days. Final weights of animals on supplemented feed averaged 2.2% more than controls, and average daily gains were increased by 0.2 lb.

Chlortetracycline significantly reduced the necessity for treatment of disease from all causes — 240 control animals required treatment as compared with 36 in the supplemented groups. In an outbreak of foot rot, 172 control animals were affected while only two of the supplemented animals showed symptoms. In all diseases other than foot rot, 68 control animals required treatment and only 34 chlortetracycline-supplemented animals required treatment.

REFERENCES

1. Bartley, E. E., Fountaine, F. C., Atkeson, R. W., and Fryer, H. C., Antibiotics in Dairy Cattle Nutrition. I. The Effect of an Aureomycin Product (Aurofac) on the Growth and Well-being of Young Dairy Calves. *Jour. Dairy Sci.*, 36:103, 1953.

2. Bartley, E. E., Fountaine, F. C., and Atkeson, F. W., Antibiotics in Dairy Cattle Nutrition. II. Effects of Feeding an Aureomycin Product (Aurofac 2A) to Lactating Dairy Cows. *Jour. Dairy Sci.*, 36:402, 1953.

3. Beeson, W. M., and Perry, T. W., Chopped Forage vs. Pasture for Feeding Cattle. Purdue Univ. Agric. Exp. Sta. Mimeo. no. A.H. 122a, 1953.

4. Duitsman, W. W., and Kessler, F. B., Beef Cattle Feeding and Breeding Investigations for 1952-53. Round-up Report no. 40 (A Progress Report). Kansas Agr. Exp. Sta. Cir. no. 298, 1953.

5. Duitsman, W. W., and Kessler, F. B., Beef Cattle Feeding Investigations: 1953-54. Round-up Report no. 41 (A Progress Report). Kansas Agr. Exp. Sta. Cir. no. 307, 1954.

6. Haq, M. O., Rusoff, L. L., and Gelpi, A. J., Jr., Antibiotic Feed and Vitamin B_{12} Supplements for Lactating Dairy Cows. *Science*, 115:215, 1952.

7. Jacobson, N. L., Kaffetzakis, J. G., and Homeyer, P. G., The Effect of Aureomycin Feeding on Changes in Weight and in Body Measurements of Dairy Calves. *Jour. Dairy Sci.*, 35:1094, 1952.

8. Jensen, R., Flint, J. C., and Griner, L. A., Experimental Hepatic Necrobacillosis in Beef Cattle. *Am. Jour. Vet. Res.*, 15:5, 1954.

9. Matsushima, J., Dowe, T. W., and Adams, C. H., Effect of Aureomycin in Preventing Liver Abscess in Cattle. *Proc. Soc. Exp. Biol. Med.*, 85:18, 1954.

10. Perry, T. W., Beeson, W. M., Hornback, E. C., and Mohler, M. T., Aureomycin for Growing and Fattening Beef Animals. *Jour. An. Sci.*, 13:3, 1954.

11. Robinson, T. J., Jasper, D. E., and Guilbert, H. R., The Isolation of *Spherophorus necrophorus* from the Rumen Together With Some Feed-lot Data on Abscess and Telangiectasis. *Jour. An. Sci.*, 10:733, 1951.

12. Tovrea, E., Personal communication, 1954.

13. Warner, R. G., Recent Findings on Antibiotics and Surfactants for Ruminants. Proc. 1952 Cornell Nutr. Conf. for Feed Manufacturers, 1952.

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Irradiated Cellulose

A report from Oregon State College concerns irradiation of sawdust by means of high level *beta* and *gamma* rays so that the cellulose may be used as feed for cattle. It is reported that the enzymes in the cow's digestive fluid can convert the irradiated cellulose into sugar in a manner similar to that following the change that takes place in the digestive tract following the consumption of corn and other grains. It will be interesting to see further reports of this project.

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If the veterinary profession does not accept its responsibility in mastitis control, reversing the existing trend — lukewarm, apathetic or even complacency toward mastitis — then some measures will probably be proposed by other groups and adopted by the dairy industry thus circumventing veterinary professional service for control.—*Joe Simon, D.V.M.*, in *Vet. Sci. News*, Spg. 1957.

Niacin for Pigs

Tryptophan has a sparing effect on the niacin requirement of pigs. This amino acid can be converted into niacin in the body, under given conditions. Since this is true, it is difficult to produce niacin deficiency in pigs on a feed made with natural feed ingredients having a protein level of 18% or higher. There is bound to be enough tryptophan as well as niacin in these ingredients to take care of the pigs' niacin needs. When the protein level is less than 15%, it is relatively easy to develop niacin deficiency in weaned baby pigs under 25 lb. weight. This information came from a report by Dr. R. W. Luecke of Michigan State University.

This observation suggests at least one reason why it is advisable to feed baby pigs a feed testing at least 18% protein. This would be particularly important in early-weaned pigs.

Doctor Luecke also points out that niacin present in corn occurs in a "bound" form. This "bound" niacin is not readily available to the pig. The microbiological assay technic currently used to measure niacin levels in feedstuffs does not distinguish between available and unavailable niacin. If the test shows corn to contain 10 mg. of niacin per pound, perhaps only 2 or 3 mg. are actually available to the pig. It may also be true that other feed ingredients have at least some portion of their niacin content in a 'bound" form.

There is a similar situation in the phosphorus content of the usual vegetable feed ingredients. The phosphorus is "bound." This "phytin-phosphorus" is not completely available to monogastric animals. That is why phosphates from other sources must be added to a mixed feed intended for poultry or hogs.

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Salt poisoning can be produced in swine with rations containing 5 to 9% salt (NaCl) when water intake is limited. Epileptiform seizures, apparent blindness, convulsive movements, pressing the head or nose against fixed objects, and thirst are clinical signs suggestive of salt poisoning.

No gross lesions are apparent on autopsy. Necrosis of the gray matter, proliferative changes in the blood vessels and vascular cuffing are noted on histological examination. Eosinophilic infiltration distinguishes this condition from the known encephalitides.—*E. O. Haelterman, D.V.M., in Kansas State Extension Bulletin, May 1957.*

Cysticercosis In Cattle As A Herd Problem And Its Significance To The Public Health

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IT is known that cattle infected with the *Cysticercus bovis* are not uniformly distributed throughout the country. Some areas are nearly free of this parasite, whereas the incidence in other sections is relatively high. Little information appears in English literature, however, on the detailed distribution of the infected animals in the more or less high prevalence areas. In spite of the long history and world-wide prevalence of cysticercosis,[2] only limited knowledge of the natural epizootiology of this disease is available.

This paper reports on the observations which indicate that a considerable number, perhaps majority, of all cattle infected with the *C. bovis* originate in herds in which cysticercosis is enzootic. Such herds may serve persistently as infection reservoirs propagating through the infected meat the beef tapeworm infections of man. They are of particular epidemiologic importance in the states which do not practice state-wide and well organized meat inspection.

Materials and Methods

These observations were conducted in a slaughterhouse located in western Michigan, Grand Rapids area, operating under municipal meat inspection and having a capacity of about 300 cattle killed per week. The moderate speed of operations and the proximity to the communities from which the local cattle were supplied made the tracing of their origin relatively easy. Since no writing of this report was planned in advance and the importance of some factors recognized only when these observations were in progress, pertinent data were not obtained and recorded in all cases.

Generally, inspection was conducted according to the regulations govering federal meat inspection.[5] In suspected cases, however, carcasses were given additional scrutiny consisting chiefly of more than usual incisions in the heart and double incisions through both internal and external masticatory muscles.[6,8] These double incisions in some instances revealed cysts which would have been undetected by routine inspection procedure. If in a lot originating from the same herd any carcass showed one or more encysted larvae, disregarding the degree of their development or degeneration, all other cattle of that lot were suspected of being affected with cysticercosis and were inspected or reinspected in the above described way. When an infected carcass was detected, information was sought from plant management regarding origin and the number of cattle brought from the same herd.

The majority of cattle slaughtered at the plant were high grade, beef type cattle shipped *via* Chicago stockyards from midwestern states. Infection with *C. bovis* in these cattle were so rare that inclusion in the data presented was not deemed necessary. Almost all infected animals were from local, western Michigan cattle, either indigenous to the area or brought from somewhere else as feeders and finished for beef by local farmers. The number of these local cattle was estimated at approximately 30% of the total cattle killed and inspected.

TABLE 1. Summary of Findings of Cysticercosis in Cattle in a Slaughtering Establishment in Western Michigan from 1953 to 1956

Year	1953	1954	1955	1956
Number of inspected cattle and calves	11,251	14,726	14,983	17,363
Number of infected* local animals	10	23	13	10
Number of infected animals from infected herds**	2	19	12	—
Number of presumably sporadic cases**	8	4	1	10
Estimated number of local cattle and calves	3,375	4,417	4,494	5,208
Estimated percentage of local infected animals	0.3	0.5	0.3	0.2

*Included were all findings from one dead and degenerated cyst to excessive infection.

**Infected herds were regarded those from which two or more cattle were found infected. Sporadic cases were designated arbitrarily as all individually presented cattle and single ones detected in any lot.

TABLE 2. Data on the Infected Herds

Herd Date of inspection	No. in lot	No. infected	Degree of infection
July 21, 1953	4	2	moderate
Sept. 3, 1954	30	19	slight
July 20, 1955	—	2	moderate
Dec. 23, 1955	13	3	slight
Sept. 29, 1954	4	3	moderate
Sept. 17, 1955	9	4	moderate
Nov. 19,1955	8	3	moderate
Jan. 5, 1957	19	13	moderate

Results

The results of the findings of cysticercosis in these cattle are summarized in table 1. Data on the infected herds are given in table 2. Of particular interest appears to be herd 5, the history of which could be followed throughout a period of three years. The owner of the herd, a retired mail carrier, bought quality feeder cattle and finished them for beef. For two years he bought feeders from a dealer whose reputation was questioned at times. For the third year, he acquired the feeders from a different source, but infection persisted.

In attempt to detect source, the farm was visited by the writer and viewed superficially. No natural streams were evident. No migratory workers[7] were employed on that or neighboring farms. One of two homes on the farm was situated close to the barn. The construction and functioning of the equipment for sewage disposal was not checked; the owner claimed, however, that it was in best order. A border of pasture land, partially covered with bushes and trees, was adjacent to a railroad trunk. Repair crews were seen working in summers at the trunk, and some men might have been contaminating the pasture. The detailed investigation was impracticable on that farm, and the source of infection remained unsolved. Since farming was only a hobby and not a basis of livelihood to the owner, he decided to abandon cattle feeding.

Discussion

Because the number of local cattle involved in these observations was relatively small and not accurately known, the incidence shown in table 1 may not reflect the true prevalence of cysticercosis in western Michigan. Since cattle from once known infected herds were not desired by the plant management and apparently have been channelled for slaughter to some uninspected places by farmers themselves, the actual prevalence of the disease is probably higher than data in table 1 indicate. The absolute number of the infected cattle detected over a period of four years from farms scattered in two or three counties seems to indicate that the occurrence of beef tapeworm *(Taenia saginata)* in this area may be relatively frequent.

From all infection detected, 59% was from the infected herds and 41% from presumably sporadic cases. Considering the possibility that some supposedly sporadic cases might have been actually originating in the infected herds, the ratio indicates that in the area observed the majority of infected cattle were concentrated in herds in which cysticercosis was affecting more than one animal and probably had persisted for years. In herds no. 2 and 5, infection was spread to epizootiological proportions. The enduring character of the cysticercosis on certain farms was clearly evidenced by the observation on herd no. 5. Although its persistence was not established by direct evidence in the others, various degrees of development and degeneration of larvae detected in the carcasses from these herds suggest the probability that these cattle, too, may have been reinfected repeatedly.

The infected herds appear to be of far greater epidemiologic significance than the accidently[4] infected individual cattle. The output of infected meat from infected herds may be large and continuous from year to year. Because of steady or periodic reinfection, meat of animals from infected herds is more likely to contain large numbers of live larvae, whereas in the accidently infected cattle, they may be less numerous and all die within a period of time.[8] Inspection may, or may not control cysticercosis in cattle, depending upon its extent and adequacy on the local level. It has been stated that about 30 or 35% of the meat and meat products consumed in the United States do not receive federal or comparable inspection.[1,7] While cysticercosis is most likely to occur on farms where sanitary and management practices are poor,[8] cattle from such farms in most cases are slaughtered in small establishments supplying local need and often operating without or under inadequate inspection. It is conceivable, therefore, that in rural areas neighboring to herds with well established cysticercosis, the infection of man with the beef tapeworm may reach epidemic proportions.

The observations presented here are of a

casual nature, and can do little more than direct attention to this problem and indicate the need for more well planned epizootiological studies of cysticercosis. If it could be established that cysticercosis is enzootic in relatively large numbers of herds and that they are the chief suppliers of the infected cattle, improvements in the local meat inspection service, tracing of affected cattle to the place of origin, detection and elimination of the infection sources on the respective farms, along with the other generally recognized principles of disease control, would bring better results than have been achieved thus far, and probably would lead soon to its complete eradication.

Summary and Conclusions

1. The findings of cysticercosis in a limited number of local, western Michigan cattle indicate a relatively high prevalence of this disease in the area observed.

2. The enzootic and epizootic occurrence of cysticercosis in several herds of cattle was observed and described.

3. In areas where local meat inspection is inadequate or not practiced at all, herds persistently affected with cysticercosis may cause beef tapeworm epidemics.

Acknowledgment

The author express thanks to Dr. John J. Godisak, public health veterinarian, Grand Rapids Health Department, Grand Rapids, Mich., for supplying valuable informative material and helpful suggestions.

REFERENCES

1. Bailey, H. G., Municipal Meat Inspection. Proc. Book, Am. Vet. Med. Assn., 1950, pp. 122-125.
2. Craig, Ch. F., and Faust, E. C., Clinical Parasitology. Lea and Febiger, Philadelphia, 1951.
3. Hutyra, F., Marek, J., and Manninger, R., Spezielle Pathologie und Therapie der Haustiere, Vol. II, 9th ed., Gustav Fisher, Jena, 1945.
4. Lapage, G., Veterinary Parasitology. Ch. C. Thomas, Springfield, Ill., 1956.
5. Regulations Governing the Meat Inspection of the U. S. Dept. of Agr., U. S. Govt. Printing Office, Washington, D. C., 1952.
6. Schonberg, F., und Zietzschmann, O., Die Ausfuhrung der tierarztlichen Fleischuntersuchung. 3rd ed., R. Schoetz, Berlin, 1944.
7. Scientific Exhibits Committee, Cysticercosis and Trichinosis, *Jour. Am. Med. Assn.*, 117:100, 1950.
8. Thornton, H., Textbook of Meat Inspection, Alex. Eger, Chicago, Ill., 1949.

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Unlike chickens, guinea hens lay more eggs the second laying season (May through September) than the first.

A Note on the in vitro Sensitivity to Nitrofurans of Listeria monocytogenes†

M. T. I. CRONIN,* M.R.C.V.S., M. Sc., Ph.D., and ALICE B. MORAN,** M.S., Lexington, Kentucky

The report by Dodd and Stillman[1] of the antibacterial properties of nitrated furan derivatives has been followed by a great number of experimental and clinical studies of this new type of antimicrobial compound. Several nitrofurans are now used widely in clinical medicine.[2] In veterinary medicine the best known are furacin® (nitrofurazone N.F. or 5-nitro-2-furaldehyde semicarbazone)[3,4]; furadantin® (nitrofurantoin or 5-nitro-2-furfurylidene aminohydantoin)[5,6]; furamazone® (nifuraldezone or 5-nitro-2-furaldehyde semioxamazone[7,8]; and furoxone® (furazolidone or 5-nitro-2-furfurylidene-3-amino-2-oxazolidone).[9,10] An early basic study of furoxone mentions *in vitro* antimicrobial effects of this drug on *Listeria monocytogenes*.[11] As this organism is an important pathogen, particularly in cattle and sheep, its *in vitro* sensitivity to several nitrofurans was investigated.

Material and Methods

Seven recently isolated strains of *L. monocytogenes* were used in this study. These strains were recovered from bovine brain tissue at necropsy of animals that had exhibited clinical signs suggestive of listeriosis. Six nitrofurans, furacin, furadantin, furoxone, furamazone, furadroxyl (5-nitro-2-furaldehyde (B-hydroxyethyl) semicarbazone) and N.F. 291 (5-nitro-2-furfuryl iodoacetate) were tested. The media and technics employed have been described fully in a previous paper.[12]

Results and Discussion

The concentration of the compounds required to produce bacteriostatic and bactericidal effects are set forth in table 1. Furoxone appeared to be the most effective compound, being bacteriostatic at an average concentration of 1.2 mg. per 100 ml. and bactericidal at

†The investigation reported in this paper is connected with a project of the Kentucky Agricultural Experiment Station and is published with the permission of the Director. The investigation was supported in part by Eaton Laboratories, Norwich, N. Y.

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®Eaton Laboratories, Norwich, N. Y.

TABLE 1. *In vitro* Sensitivity of Seven Strains of *L. monocytogenes* to Certain Nitrofurans

	Minimal inhibiting concentrations (mg./100 ml.) at 96 hours			
	Bacteriostatic		Bactericidal	
Compound	Range	Mean	Range	Mean
Furacin	4.0-7.0	5.2	5.0- 8.0	6.2
Furadantin	4.0-6.0	5.3	4.0- 7.0	6.0
Furamazone	3.0-4.0	3.3	3.0- 7.0	4.5
Furoxone	1.0-2.0	1.2	2.0- 3.0	2.3
Furadroxyl	3.0-6.0	4.5	4.0- 8.0	6.1
N.F.291	5.0-9.0	7.0	6.0-10.0	8.0

a concentration of 2.3 mg. per 100 ml. Furamazone was the next most active nitrofuran, while furacin and furadantin were less active. Furadroxyl and N.F. 291 were the least effective compounds tested.

Yurchenco *et al.*[11] found their strain of *L. monocytogenes* twice as sensitive to furoxone as the most sensitive of the strains included in the present study. The source of their strain was not stated. The sensitivity of this organism to furamazone is in marked contrast to the relative ineffectiveness of this compound against streptococci of equine origin as previously reported.[12] The observation that *L. monocytogenes* is sensitive *in vitro* to moderate concentrations of a number of nitrofurans suggests the potential value of further *in vitro* and *in vivo* trials.

Summary

Seven recently isolated strains of *L. monocytogenes* were tested for sensitivity *in vitro* to six nitrofuran compounds. The inhibition of these strains by low concentrations of nitrofurans suggests the value of further *in vitro* and *in vivo* tests.

REFERENCES

1. Dodd, M. C., and Stillman, W. B., The *in vitro* Bacteriostatic Action of Some Simple Furan Derivatives. *Jour. Pharm. Exp. Therap.*, 82:11 (Sept.), 1944.
2. MacLeod, P. F., Rogers, G. S., and Anzlowar, B. R., The Nitrofurans in Clinical Medicine, *Internat. Rec. Med.*, 169:561 (Sept), 1956.
3. Jones, S. V., Belloff, G. B., and Roberts, H. D. B,. Clinical Use of a New Nitrofuran Dosage Form in the Retained Placenta Syndrome in Cattle. *Vet. Med.*, 51:413 (Sept.), 1956.
4. Lannek, N., and Brag., S., The Prophylactic Value of Nitrofurazone in *Salmonella choleraesuis* Enteritis of Pigs: A Field Experiment. *Vet. Med.*, 49:75 (Feb.), 1954.
5. Moiser, J. E., A Preliminary Report on the Use of Nitrofurantoin in Treatment of Canine Tracheobronchitis (Kennel Cough). *Vet. Med.*, 50:605 (Nov.), 1955.
6. Belloff, G. B., Furadantin. *California Vet.*, 9:27 (Sept.-Oct.), 1956.
7. Bull, W. S., Entefur Therapy in Calf Enteritis in Winter Dysentery. *N. Am. Vet.*, 38:3 (Jan.), 1957.
8. Henry, R. T., and Blackburn, E. G., Treatment of Calf Enteritis with Nifuraldezone Compound. *Vet. Med.*, 52:122 (Mar.), 1957.
9. Lucas, F. R., Use of Furazolidone in a Field Outbreak of Salmonellosis in Mallard Ducks. *Jour. Am. Vet. Med. Assn.*, 129:529 (Dec. 1), 1956.
10. Jerstad, A. C., Furazolidone for Infectious Enterohepatitis (Blackhead) of Turkeys. *Am. Jour. Vet. Res.*, 18:174 (Jan.), 1957.
11. Yurchenco, J. A., Yurchenco, M. C., and Piepoli, C. R., Antimicrobial Properties of Furoxone (N-5-Nitro-2-Furfurylidene-3-Amino-2-Oxazolidone). *Antibiotics*, 3:1035 (Oct.), 1953.
12. Moran, A. B., and Cronin, M.T.I., The *in vitro* Sensitivity to Nitrofurans of Organisms Isolated from the Uteri of Thoroughbred Mares. *Jour. Comp. Path.*, 67:106 (Jan.), 1957.

Penicillin in Milk

Since it has been demonstrated that penicillin may be present to the extent of approximately 500 units in a quart of milk, for about 72 hours following the last infusion in the treatment of bovine mastitis, it is now recommended that milk obtained during this period not be marketed. Cheese manufacturers, for example, have found that minute quantities of an antibiotic in milk makes it unsatisfactory for the making of fermented dairy products. It is generally conceded that milk containing these small amounts of penicillin will not materially affect the intestinal flora of the average healthy person consuming it, but the highly sensitive individual might suffer an unfavorable reaction. In at least one state, a purveyer of milk of this kind has been hailed into court and fined because the authorities considered the milk "adulterated."

Veterinarians are urged to advise their clients not to add milk from treated quarters to the fluid milk supply for human consumption for a period of at least three to six days after the last infusion of antibiotics. It is also advisable to suggest that in general no more than 100,000 units be used for any single treatment. It is estimated that 75 tons of antibiotics are used annually, mostly by laymen in the treatment of bovine mastitis. — *R. R. Dykstra, D.V.M.*

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Cannibalism and pick-outs can be suppressed in poultry flocks by supplementing feed with 0.1% methionine, an amino acid.

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When brucellosis is eliminated in animals it will be no longer a health problem in man.— *James H. Steele, D.V.M.*

The History Of Some Current Problems In Animal Disease VI. Hog Cholera

J. F. SMITHCORS,* D.V.M., Ph.D., East Lansing, Michigan

THE early history of a number of diseases is obscure. This is especially true of those conditions which are difficult to diagnose by symptoms alone, as in cases in which one disease may exhibit symptoms resembling another, or when two related diseases coexist. The infrequency with which postmortem examinations were conducted until relatively recently, as history goes, has left clouded many issues which might easily have been resolved. The problem has been made still more difficult by the confusion of names applied to one entity, or by the use of the same name for a variety of diseases.

The tribulations of those who investigated hog cholera in the late 19th century are sufficiently well known to preclude tedious repetition. Nor would it serve any useful purpose to relate the fanciful ideas which held sway until the true nature of the disease was discovered. Instead, the present paper is an inquiry into the circumstances which led to the identification of hog cholera as an entity, and a discussion of the role played by the study of this disease in establishing a firm basis for the concepts of the causation of disease.

Insular Immunity

It is generally considered that hog cholera was first seen in Ohio in 1833, that it had become a major problem by the late 1850's, and that it was not found in England until 1862, nor on the continent of Europe until 1887. With regard to the epizootic occurrence of hog cholera, this may very well be the case. But, of course, it is well known that great fluctuations occur in the incidence of epizootic diseases whether specific efforts are being made to control them or not. And it is apparent that in the case of most of the great animal plagues, with respect to any given locale, that each existed in a sporadic form, sometimes over a long period, before its appearance in epizootic proportions. The conditions which existed in America prior to 1800 would not have been conducive to the widespread occurrence of epizootic disease. The animal population was, for the most part, protected by a combination of circumstances. In the first place, the domestic animals of America had all been brought from the Old World into a relatively disease-free environment. True, they did bring Old World diseases with them, but the small animal populations in scattered settlements kept these problems on a local basis. The poorly developed transportation system further insured this insular immunity from contagion.

One other factor was operative in delaying the "incidence" of any particular disease entity. Prior to the early 19th century, we find few good descriptions of diseases of domestic animals. While there are a number of outbreaks of various diseases recorded, we have little to go on other than the name of the disease. Until the founding of an agricultural press in 1819, there was no medium for the regular reporting of animal diseases — unless a particular outbreak was of such proportions that it became newsworthy. It is evident, then, that in the absence of descriptions of a disease resembling hog cholera, for example, that this disease could not have "existed" until it was serious enough to merit being given a name.

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This article, and others by Doctor Smithcors (50:525 [Nov.], 1955; 51:89 [Feb.], 1956; 51:249 [Jun.], 1956; 51:457 [Oct.], 1956) reflect a measure of the exacting research required to write the history of veterinary medicine. A new book containing the full story, entitled Evolution of the Veterinary Art, has been published by VETERINARY MEDICINE, and is now available.

If the noblest and most ambitious design an historian can follow is to be like Socrates, "a midwife of ideas," then Dr. J. F. Smithcors will very likely achieve that end. His journal articles and his new book, Evolution of the Veterinary Art, reflect the work of an honest craftsman first, an architect second.

Doctor Smithcors not only tells the story of veterinary medicine, he explains it. If the scholarship displayed throughout this article serves to catalyze a dormant interest in veterinary history, the author's aim will be met.

Feral Swine

In the case of the diseases of swine in particular, still another factor must be considered, *viz.*, the diseases of swine — in fact, pigs themselves as property, were given little overt thought by farmers until the growth of metropolitan areas led to the establishment of large hog farms. It was this latter development that, of necessity, focused attention upon the diseases of swine. The American settlers, at least those from England, brought with them the then-typical British indifference to the value of the pig as a possession. The British veterinarian, William Youatt, in his book on The Pig (1846), says: "Swine, from having been, until very lately, considered as a subordinate species of stock, have not yet, to any extent, become sharers in the benefits which the present advancing state of veterinary science has conferred upon other domesticated animals. When anything goes wrong in the piggery, the farmer too often, instead of exercising that shrewd sense which he turns to so good an account in almost every other instance, either sends for the butcher, or consigns the sick tenants of the sty to the care of an ignorant "pig-doctor," whose whole pretensions to leech-craft rest on the possession of some antiquated recipe, which he uses indiscriminately as a grand panacea for all the ills swine's flesh is heir to."

Concerning the "swinish multitude" in the towns of America, Youatt quotes Dickens, who says, "They are the city scavengers, these pigs; ugly brutes they are, having for the most part scanty brown backs, like the lids of old horsehair trunks, spotted with unwholesome black blotches; they have long gaunt legs, too, and such peaked snouts, that if one of them could be persuaded to sit for his profile, nobody would recognize it for a pig's likeness; they are never attended upon, or fed, or driven, or caught, but are thrown upon their own resources in early life, and become preternaturally knowing in consequence. Every pig knows where he lives much better than anybody could tell him." Of the pigs in rural areas, Youatt states, "No reasonable fence can stop them; but ever restive and uneasy, they rove about, seeking for plunder, swilling, grunting, rooting, pawing — always in mischief and always destroying. The more a man possesses of such stock, the worse is he off; and he had far better sell his produce at any price, than put it into such totally worthless creatures."

Under such conditions, it would be reasonable to suppose that if hog cholera had existed, that it would most likely have gone unnoticed — except, perhaps, by the more genteel townspeople who in crossing the street may have had fewer challenges from the "republican pig," which Dickens describes as "going wherever he pleases, and mingling with the best society, on an equal if not superior footing, for everyone makes way when he appears." That this was not an exaggeration may be appreciated from the statement of a medical investigator of the hog cholera situation in Indiana in 1879 (Dept. of Agriculture Special Report no. 12, Diseases of Swine): "In the city of New Albany, Indiana, there are more swine to the square mile than elsewhere in the state; their rights are somewhat sacred; they run in every street, sleep in every alley, and break into almost every yard; as scavengers they constitute a sort of independent body of health police, auxiliary to the board of health; the average councilman regards them in some sense as his constituency, and the people, therefore, have vainly prayed for hog-ordinances and hog-cholera, and still the animal feeds upon our bounty, multiplies his race, and almost defies disease." Today it would seem almost incredible that a people should pray for affliction of their neighbor's animals in the naive belief that this would be a less onerous burden than the immediate problem which confronted them.

This same investigator, D. W. Voyles, M.D., in considering the cause of hog cholera, states: "The past history of the disease would indicate that it originated in this country at a time when the condition of swine was visibly altered from a comparative state of nature to one of more perfect domestication." He argues that so long as the hog was kept in a semi-feral state, with his own choice of natural foods and a relatively clean environment, that swine "enjoyed under these circumstances a vigor of constitution and an immunity from disease unknown to the modern swine-breeders of the country."

Humoral Pathology

Whether hog cholera arose *de novo* in America, or was imported from Europe, is a moot question, one, perhaps, that is not susceptible to resolution. While a number of writers admit the latter possibility, the consensus is that hog cholera is an "American" disease. In the case of diseases which exhibit strongly pathognomic symptoms, in both man

and animals, practically all can be demonstrated to have an ancient origin, even the names of some being the same, or similar to those we use today, *e.g.*, tetanus (Gk. *tetanos*). In the case of other diseases, the evidence left by early writers is at best presumptive, but relatively good descriptions of a great variety of diseases have been left by the Roman writers on animal husbandry. Following this time, there are few writings of any nature on the diseases of animals, except for the horse, until about the 17th century, and few of these are as descriptive as those left by the early Romans.

Columella, an agricultural writer of the first century, in his book Of Husbandry (trans. 1745), states that among the diseases of swine: "Also the whole herd uses to be so sick, that it is emaciated, and takes no food; and when they are led forth to the pastures, they lie down in the middle of the field, and, being seized with a certain lethargy, they give themselves wholly up to sleep in the heat of the summer sun." His reference to the necessity for "driving out the bile" suggests that this may be the same disease Aristotle had referred to some four centuries earlier as the cholera (Gk. *kholera* — biliousness) in pigs.

The term "cholera" comes from and has been confused with *choler*, or bile, in many of the later writings. Yellow bile and black bile were two of the four humors, or body fluids, which were postulated by the Hippocratic school of medical thought (*ca.* B.C. 300) as being the seat of disease. As elaborated upon by Galen in the first century A.D., they formed the basis for the humoral theory of pathology which, although the best theory that had been formed from the facts then extant, retarded the advance of medicine for some 15 centuries. Thus, an excess of yellow bile was described as leading to a *choleric* and black bile to a *melancholic* temperament, and certain diseases in both man and animals became associated with these temperaments. The description of a choleric state, or the designation of a disease entity as choler, therefore, can not be associated with a specific condition. In fact, the term cholera, whether of man, animal or fowl, is a direct product of the infection of man's mind with the persistent theory of humoral pathology. The term, however, seems likely to persist for some time yet.

Fleming, in his work on Animal Plagues (1871), records numerous epizootic outbreaks which affected only swine, beginning with one in the year 1040 in Ireland. Because symptoms are not recorded for these early outbreaks, however, it would be impossible to determine what the diseases may have been. In the 18th century, repeated fatal outbreaks of epizootic erysipelas are reported in Germany and the surrounding countries by Wirth, who considered it to be a form of anthrax. But Fleming considers these, and outbreaks in France in 1821 which were termed "pleuropneumonia," to be "swine plague." These French outbreaks, which apparently began in 1811, are described below. Between 1836 and 1840 in Ireland, a series of outbreaks of a disease in pigs was reported "under the name of cholera, on account of the black color the animal assumed." The disease was described as a form of fever with inflammation of the bowels, with immense numbers of animals being carried off. Another description notes it as an eruptive fever, like measles in man, in which "finally the whole skin became one universal patch of floridity." A similar "inflammatory epizootic among pigs, rapid and fatal in its course," was reported in England in 1838.

"The Choler in Hogs"

In the absence of full descriptions of the disease, it would be rash to say that these were outbreaks of hog cholera. But the presence of a disease in England resembling hog cholera long before this time is suggested by a good description of *the choler* in hogs from The Gentleman and Farmer's Guide for the Increase and Improvement of Cattle (1729). The author, Richard Bradley, a professor of botany at Cambridge, but also an astute agriculturalist, says: "The Distemper called the Choler, in Swine, shews itself by the Hog's Losing its Flesh, Forsaking it Meat, and being more inclined to Sleep than ordinary, even refusing the fresh Food of the Field, and falling into a deep Sleep as soon as he enters it. It is common, in this Distemper, for an Hog to sleep more than three Parts in four of its Time; and consequently he cannot eat as Nature requires him sufficiently for his Nourishment. This is what one may call a Lethargy; for he is no sooner asleep, but he seems dead, not being sensible, or moving, though we beat him with the greatest Violence, till, on his own Accord, he recovers.

"This Distemper, few of the Country Farmers do know what to make of: Some judge it to be pestilential, and as soon as they perceive a Hog is taken with it, they separate him from the Herd: Others, still as ignorant,

believe the Distemper proceeds from Witchcraft."

The "most certain and approved Remedy," says Bradley, is to purge them with wild cucumber root, followed by horse beans softened in pork brine, "or in fresh human Urine, from some healthful Person." That he did not depend solely upon the "approved" remedies of others is evident from his statement that he has tried rhubarb root in barley meal, "and it has had a good Effect, by bringing the Hog to feed with good Appetite. This purges the Hog in a more gentle manner than the former, and . . . it is as certain."

Sleeping Evil

Bradley also mentions as a separate entity, "the Pestilence, or Plague, in Swine," which he recognizes as being contagious, and recommends segregation and cleanliness, together with purging. The "Distemper in the Lungs of Swine," he says "is a Distemper proceeding purely from want of Water." In another section he mentions "the Sleeping-Evil, or Lethargy, in Swine . . . because it is known in some Countries only as the Sleeping-Evil, though I have already mentioned the same Case under the Title of Choler." This statement, taken in conjunction with his description of most of the diseases of swine recognized today, would seem to be *prima facie* evidence of the existence of a hog cholera-like disease both in England and other countries at this time.

The early descriptions by veterinarians of a hog cholera-like disease are summarized by Youatt in his book on The Pig (1846). In the *Journal de Medecine Veterinaire* for 1832, M. Saussol describes a "violent and mortal" disease that attacked "nearly all the swine in the neighborhood of Mazamet" in 1821. The first symptoms were "inappetency, thirst, dulness, groaning, and seeking of moist places; then followed by hardness of the belly, heat of the skin, constipation, diminution of the urine, difficulty of respiration, heaving of the flanks, and short cough; the eyes were full of tears, and the mucous membranes inflamed." The onset was sudden and death occurred in a few days. On postmortem examination, the symptoms were those of pneumonia and enteritis. Other outbreaks in France in the 1830's were reported to be highly contagious and of frequent occurrence. Additional symptoms included a red tinging of the skin, ending in gangrene, and a livid hue of the diseases surfaces. Similar outbreaks in England, as reported in the *Veterinarian* (1838, 1841) mention "the reddish hue of the skin," and "patches of inflammation throughout the whole of the intestines," in addition to the symptoms given above. In most cases the malady was "so fatal that medical treatment avails nothing."

In the Report of the Commissioner of Agriculture for 1877, these French outbreaks are described in detail in an article by Thomas M. Healy, M.D. In another article, H. J. Detmers states, " . . . so-called hog-cholera is not a new disease, nor peculiar to our country, as people seem to believe. It has been known in Europe for many years." He cites a description of the disease in a German work, *Die Krankheiten der Schweine* (1842) as proof of the fact. And in the USDA publication on Hog Cholera (1889), D. E. Salmon states: "Whether the outbreak which occurred in Ohio in 1833 was the first introduction of hog cholera in this country or not, cannot now be determined. It seems reasonably certain, however, that the contagion was imported from Europe with some of the animals that were brought from there to improve our breeds of swine . . . [rather] than that it appeared spontaneously or was developed by the conditions of life in this country."

Origin of Hog Cholera

Except that there is some merit in correcting a misconception of any sort, it is perhaps of small moment to be concerned over the apparent origin of hog cholera. The evidence adduced in favor of the probability that the first outbreak of hog cholera in this country had its origin, remotely or directly, from imported stock is, perhaps, at best presumptive. More or less in the same category is the liklihood that hog cholera is an ancient, rather than a "modern" disease. And while there should be no attempt to evade whatever onus might be attached to any particular country, in this case the United States, being the "birthplace" of a major animal plague, there is one aspect of this "controversy" which may be of significance. The more one delves into the history of disease, the less acceptable the idea of a "new" disease becomes. Even in the absence of supporting evidence, the fact that practically every major animal plague can be traced to antiquity would suggest that recently described diseases are, more than likely, not new. It is axiomatic that in the face of two mutually exclusive alternatives, the simpler of the two is more likely to be the correct one. Hog cholera, therefore, either arose *de novo*

(Continued on page 403)

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F. D. ENZIE*, D.V.M., M. L. COLGLAZIER,* B.A., and E. H. WILKENS,* B.S.,
Beltsville, Maryland

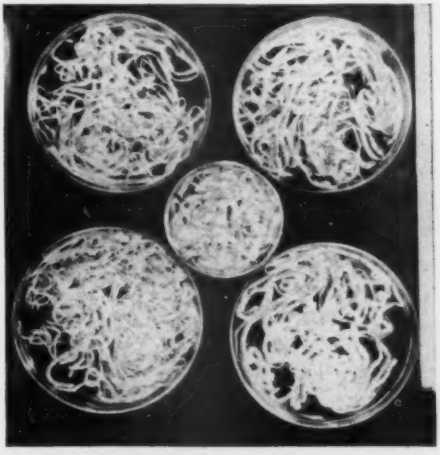
With this discussion of the changing concepts of helminthic parasite control in dogs and cats, the authors conclude a series of three reports that have appeared in VETERINARY MEDICINE (52:267 [Jun.] 1957; 52:331 [Jul.] 1957). Recent developments in anthelmintic medication have pointed up findings of particular significance to this continuing veterinary problem. These findings are recorded here in a comprehensive manner.

PART III

Dogs and Cats

Tapeworms. It is difficult to evaluate the newer small-animal teniacides on the basis of published reports because uniform methods of testing and comparable criteria of efficacy were not employed. The data are frequently incomplete and hence afford no common basis upon which comparisons of efficacy can be made. In some cases no attempt was made to record the numbers of tapeworms involved and in others data for the different species were combined in a single general category. Particularly significant is the lack of a uniform post-treatment holding period, an essential part of any teniacidal trial because of the peculiar growth of these parasites. Scolices that are deeply embedded in the intestinal mucosa are difficult or impossible to detect when the strobilae have been detached, and evaluations of teniacidal efficacy based upon postmortem examinations a day or two after treatment are apt to be misleading. In this connection, we have found that sufficient restrobilation occurs in a period of ten days to permit the detection of scolices that are unaffected by the drug.

Quinacrine hydrochloride (atabrine®[2]) showed promise of effective action against Taenia and Dipylidium of dogs in trials reported by Link and Smith[60] in 1954. These investigators gave the chemical in capsules to 23 animals at the rate of 10 to 20 mg. per pound of body weight. Active tapeworms were



Taenia pisiformis, one of the tapeworms of the dog. The larval stage is a small cysticercus found in the cavities of rabbits and some other rodents.—Benbrook.

†A revision of a paper presented by the senior author at the Symposium on Helminthic Problems in Veterinary Medicine (1955), School of Veterinary Medicine, University of Pennsylvania.

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®[2]Winthrop Laboratories, New York, N. Y.

expelled from all dogs within ten hours after treatment, but the numbers of worms were not recorded. At autopsy one to 23 days after treatment, it was found that all of the Taenia had been removed from ten of 11 dogs and all of the Dipylidium from ten of 12 dogs. There was no indication of serious intoxication although six dogs vomited shortly after treatment. In an earlier report by Halawani, Baz, Hafez, and Shawarbi,[67] a dosage of 15 mg. per kilogram of body weight was completely effective against an unspecified number of Taenia and Dipylidium in ten dogs.

Anthelin,®[3] an antimony compound known chemically as N-methyl-tetrahydromethyl-nicotinate-p-carboxyphenyl stibonic acid, was first described as a teniacide and ascaricide for dogs by Kartsonis and Austin[58] in 1950. These workers reported that the chemical removed 97% of 719 tapeworms (Taenia and Dipylidium) from ten dogs and 91% of 23 ascarids from four dogs. Nausea was noted in two of the animals and one dog vomited. The drug was given at the rate of 4.69 mg. per pound of body weight about 18 hours after a light meal; and lentin®[4] was given subcutaneously if purgation did not occur within 60 minutes. The dogs were autopsied and examined for parasites 24 hours after treatment.

In trials conducted at the Agricultural Research Center, the drug, given alone or in combination with toluene as anthol,®[3] removed 82% of 225 Taenia from 18 dogs, and 66% of 33 Dipylidium from five dogs. The chemical was given in accordance with prescribed recommendations, but the animals were not autopsied until ten days after treatment. Tapeworms were generally eliminated in mucoid feces shortly after medication, although in some cases living worms were passed involuntarily for several hours. The latter generally caused considerable annoyance resulting in the animal's licking the anus and swallowing some of the worms before they could be collected. On this account, the percentage efficacies against tapeworms in these trials are probably conservative. Nine dogs vomited and two were depressed and off feed for several hours after treatment.

Anthelin showed no significant action against ascarids, removing only 30% of 162 worms from eight dogs. The apparent discrepancy in the findings with respect to large roundworms may be explained, at least in part, by the limited data in the initial report. Large roundworms of dogs are commonly expelled spontaneously, and for this reason interpretations of limited data should be guarded.

Dichlorophen,®[1] bis(5-chloro-2-hydroxyphenyl)methane, also known as di-phenthane-70, and teniathane,®[1] has been widely used for the removal of tapeworms from dogs and cats since its action against these parasites was first reported by Craige and Kleckner[69] in 1946. It is not feasible to calculate a definitive percentage of efficacy for this drug because the teniacidal action is commonly accompanied by a partial or complete disintegration of the worms. On this account, tangible evidence of effective action, namely, recovery of the strobilae and scolices in the feces after treatment, is not always obtainable. The extent to which this unusual phenomenon occurs is not known, but it is evident from the published record as well as from our own experience with the chemical that it is not an invariable occurrence.

The efficacy of the drug, administered at the recommended dose rate of 0.5 gm. per six

®[1]Pitman-Moore Company, Indianapolis, Ind.
®[3]Jensen-Salsbery Laboratories, Kansas City, Mo.
®[4]Merck & Co., Rahway, N. J.

Ova of *Dipylidium caninum*, one of the tapeworms of the dog and cat. The eggs are contained in the capsule enlarged 100 times (left). Single capsule enlarged 400 times (right). Note hooklets in each embryo. All tapeworm ova have hooklets.—Benbrook.

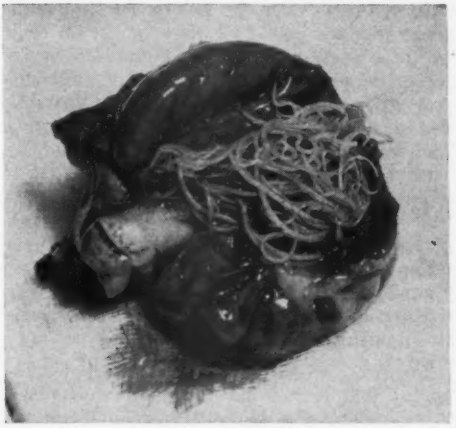
pounds of body weight, was not particularly noteworthy in trials conducted at the Agricultural Research Center. The calculated percentage of efficacy is undoubtedly conservative, however, on account of the peculiarly destructive action of the chemical. Nevertheless, the drug removed at least 12% of 52 Taenia from six dogs, and all of undetermined numbers of Taenia from four dogs. Presumably, it was partially effective also in an additional privately-owned dog which was not available for autopsy. The drug was completely effective against two Taenia in one cat.

The performance of the chemical against Dipylidium was not impressive; the two dogs that were infected with this species did not eliminate any recognizable specimens after treatment and, at autopsy, harbored seven and 130 worms, respectively. The drug was also ineffective against Dipylidium in one cat; no recognizable specimens were recovered after treatment, and 39 worms were found at autopsy.

It is particularly significant that all specimens recovered at autopsy in these trials were immature; the maximum length of the Taenia and the Dipylidium was 2.0 and 4.0 cm., respectively. This indicates rather conclusively that in these instances the action of the chemical was limited to the strobilae and that partial restrobilation occurred during the post-treatment holding period of ten days. It suggests also the possibility of error in the interpretation of teniacidal action if the animals are autopsied too soon after treatment. In this connection, the report by Blair[70] on the teniacidal action of the drug in dogs is of particular interest. On the basis of postmortem worm counts, therapeutic doses of dichlorophen removed all of the Taenia from 33 of 46 dogs, and was partially effective in the others. Moreover, all the Dipylidium were found to have been eliminated from 52 dogs, and in nine animals the treatment was partially effective against this species. The dogs were autopsied from two to 20 days after treatment, and it may be more than coincidental that the proportion of failures against both species was considerably greater in those animals that were autopsied nine or more days after treatment. It may be added parenthetically that clinical evaluations of teniacidal action are difficult because gravid segments from restrobilated scolices may not appear in the feces for at least three weeks (Dipylidium) or six weeks (*T. pisiformis*) after treatment.

®[5]Abbott Laboratories, North Chicago, Ill.

Heartworms. According to Otto,[71] thiacetarsamide (arsenamide, caparsolate®[5] sodium) is probably the most effective treatment available for the destruction of adult heartworms, but it has no significant effect on the microfilariae. The drug is given intravenously daily for 15 days at a dose rate of 1.0 cc. of a 1% solution for each ten pounds of body weight. Care must be taken to prevent perivascular leakage during treatment because the drug is extremely irritating to the tissues. Moreover, the dog should be closely confined during treatment and for a month or two thereafter until resolution of the dead worms occurs. A microfilaricide such as stibophen or diethylcarbamazine



Heartworms (*Dirofilaria immitis*) found in a pet from southern United States.

is generally given about three weeks after completion of treatment with thiacetarsamide because the microfilariae may persist for more than a year after death of the adult worms. The feasibility of employing intravenous injections of proteolytic enzymes (*e.g.*, chymotrypsin) to hasten the dissolution of dead heartworms following arsenical treatment is suggested by the findings of Soltys[72] in 1956.

Diethylcarbamazine has been used with some success by Foley[73] and Ziegler[74] in the control of heartworm infections, but it is probably less useful in this respect than the aforementioned drug. It has some action against the adult worms, but its principal effect is on the microfilariae. As a general filaricide, the chemical is given *per os* three times daily at a dose rate of 10 mg. per pound of body weight, and the blood is generally free of microfilariae within three weeks. It may be noted, however, that this regimen was ineffective in one trial conducted at the Agricultural Research Center, and that microfilariae persisted in the blood of

this animal after a subsequent course of treatment when the dosage was increased to 20 mg. per pound. (This animal was killed later in a dog fight and several heartworms were found at autopsy. Hence the microfilariae were not those of Dipetalonema sp.) The optimum dosage of the chemical when used primarily as a microfilaricide has not been definitely ascertained; presumably, a shorter course of treatment will suffice for this purpose however.

A particularly noteworthy report on the use of diethylcarbamazine as a preventive of canine filariasis was published by Garnier[78] in 1954. According to this investigator, complete control of heartworm infection was achieved in 44 dogs that received a dose of 20 to 25 mg. per pound of body weight on each of three successive days and repeated at intervals of six months. The blood of these animals remained free of microfilariae throughout the test period; and four dogs in this group that were autopsied for one reason or another during the test period were free of heartworms. All of five control dogs became positive for microfilariae during the 18-month period of observation, and all had heartworms when autopsied. The promise shown by this regimen clearly suggests the need for further trials with the chemical in endemic heartworm areas.

In 1952, Kume and Oishi[76] in Japan reported that dichlorophenarsine hydrochloride was more effective than thiacetarsamide against adult *Dirofilaria immitis*. The chemical was given at the rate of 1 mg. arsenic per kilogram of body weight on each of three successive days. With this regimen all of the heartworms were killed within ten days, and two daily injections destroyed all of the worms within 20 days. The chemical had no effect on the numbers of microfilariae. No indications of toxicity were observed in the therapeutic trials; and only occasional vomition occurred in animals that were given daily injections for seven to 15 days.

The importance of flea control in the prevention of filarial infections of dogs is suggested by the report of Stueben[77] on the incidence of *D. immitis* larvae in fleas collected from dogs infected with heartworms, and by the report of Nielson[78] relative to the development of *D. immitis* in a Canadian-born dog that was kept in association with heartworm infected dogs imported from the United States. Some of the chlorinated insecticides should be of practical use in this connection because of their residual action.

The report in 1956 by Newton and Wright[79]

Ovum of the hookworm of the dog. *Ancylostoma caninum*, enlarged 400 times.—Benbrook.

on the occurrence of a dog filarid other than *D. immitis* in the United States (presumably Dipetalonema sp.) may account for the apparent failure of certain therapeutic agents to eliminate microfilariae from the blood, for the failure to obtain adult heartworms from dogs in which microfilariae have been demonstrated in blood samples collected before autopsy, and for other unexplained findings with respect to this parasite.

Large Roundworms and Hookworms. Diethylcarbamazine is a safe and effective treatment for the removal of large roundworms from cats. The chemical is given at a dose rate of 25 mg. per pound of body weight, and it is not necessary to withhold feed before dosing. In trials reported by Kanegis[80] in 1948, the chemical removed 97% of 41 ascarids from eight kittens. The treatment was well tolerated in all respects and, moreover, no intoxication was noted in 21 additional cats that were given dosages up to 36.6 mg. per pound.

In trials at the Agricultural Research Center, Colglazier and Enzie[81] found that the drug removed 98% of 182 ascarids from eleven cats. Four of the animals vomited, but otherwise the drug was well tolerated and no significant lesions were found at autopsy. The chemical is not effective against hookworms, but cats seldom require treatment for the removal of these parasites.

Piperazine adipate was apparently completely effective against ascarids of dogs in trials reported by Sloan, Kingsbury, and Jolly[7] in 1954. The chemical was given to 13 animals at dose rates ranging from 25 to 200 mg. per kilogram body weight. A total of 193 ascarids were eliminated after treatment, and no ascarid eggs were found in subsequent fecal examinations over a period of several weeks. No ascarids were found in one of the dogs that was autopsied after treatment.

The chemical exhibited no significant anthelmintic action against *Ancylostoma caninum* in single doses up to 300 mg. per kilogram of

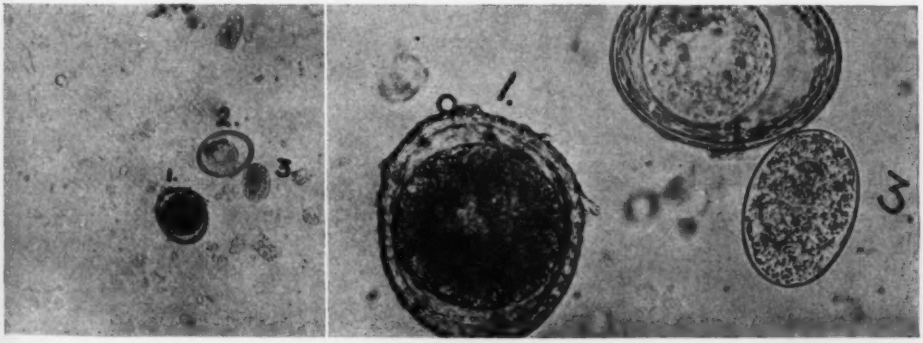
body weight; and repeated treatment failed to achieve complete removal of this species. On the other hand, a dosage of 100 mg. per kilogram body weight removed all of 38 *Uncinaria stenocephala* from two dogs; and, on the basis of post-treatment fecal examinations, a similar dosage was completely effective against this species in four of five dogs. There was no apparent anthelmintic action against Taenia and Dipylidium. The chemical was well tolerated, and specific toxicity trials showed that the drug has a wide margin of safety in these animals.

A large number of ascarids were removed from three cats that were given piperazine adipate at a dose rate of 100 mg. per kilogram of body weight. The animals were not autopsied, but no ascarid eggs were found in post-treatment fecal examinations. A similar dosage removed at least 496 ascarids from five lions. Subsequent fecal examinations indicated that all of the worms were removed from three of the animals and that infections in the other two were substantially reduced. The chemical was well tolerated in all trials, and dosages equivalent to 100 mg. per kilogram of body weight were consumed readily when given in regular feed.

In trials at the Agricultural Research Center, piperazine adipate, in dosages ranging from 35 to 100 mg. per pound of body weight, removed 92% of 64 ascarids from 15 cats but only 22% of 18 *A. caninum* from eight cats. The chemical was wholly ineffective against 473 Dipylidium in nine cats and 13 Taenia in three. Furthermore, in two dogs a dosage of 100 mg. per pound of body weight removed 75% of 34 ascarids but only 23% of 299 *A. caninum;* and at 50 mg. per pound the drug removed 40% of 27 ascarids and 12% of 292 *A. caninum* from one dog. By and large, the chemical was well tolerated in all trials; one kitten died but death was not ascribable to the treatment. No attempt was made in these trials to ascertain the optimum dosage of piperazine adipate for dogs and cats. Nevertheless, the data indicate that comparatively small amounts of piperazine exhibit marked ascaricidal action in both hosts, whereas only minimal anthelmintic action is obtained against the common hookworm, *A. caninum,* with these dosages.

Piperazine citrate was completely effective against 22 ascarids in five dogs but showed no significant action against hookworms, whipworms, or Taenia spp. in trials conducted at the Agricultural Research Center. The drug was given in single and divided doses at the rate of 50 and 100 mg. per pound of body weight. Two of the dogs vomited, but otherwise the treatment was apparently well tolerated. In trials by other investigators[83,88] the chemical exhibited marked ascaricidal action in dogs and cats but showed no reliable or significant action against hookworms, whipworms, and tapeworms (Taenia spp. and *Dipylidium caninum*).

Toluene is a safe and effective treatment for the removal of ascarids and hookworms from dogs and cats, but it is not uniformly effective against the dog whipworm. The drug compares favorably in efficacy and safety with n-butyl chloride as a general anthelmintic for small animals and appears to be superior to the latter in simplicity of dosages and range of action. The literature pertaining to the use of the chemical against the intestinal nematodes of dogs and cats was reviewed by Enzie and Colglazier[84] in 1953. In the aggregate, a dosage of 0.1 cc. per pound of body weight removed 96% of 846 ascarids from 59 dogs, 87% of 7,579 hookworms from 108 dogs, and



Parasitic ova observed in a single miscroscopic field of a preparation made from the feces of a dog. *Belascaris marginata* (1), *Toxascaris limbata* (2), *Uncinaria stenocephala* (3), as seen through low power (x 100-left) and high power (x 400 right) magnification.

41% of 2,881 whipworms from 48 dogs. A similar dosage in cats removed 99% of 205 ascarids from 25 cats and all of 28 hookworms from three cats. Several of the cats vomited, but there was no apparent nausea or inappetence.

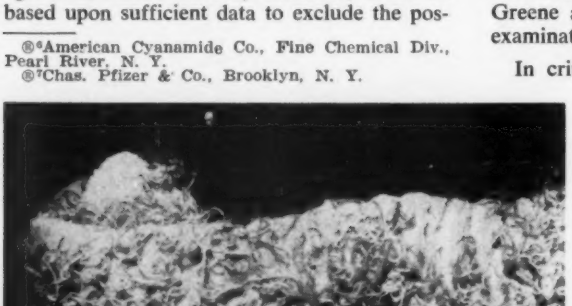
In limited trials by Brown, Mann, and Fratta[85] aureomycin,®[6] terramycin,®[7] streptomycin, bacitracin, and penicillin exhibited limited ascaricidal action in cats but showed no action against *Ancylostoma caninum*, Dipylidium spp., and *Taenia taeniaformis*. All of the antibiotics were given in comparatively large daily doses for five consecutive days, but none compared favorably with other available ascaricides that are given in single doses to these animals.

An evaluation by Loewenthal[86] of various remedies used in the treatment of creeping eruption or cutaneous larva migrans of man, including ethyl chloride and carbon dioxide snow, indicates that none of these agents is reliably effective. A determination of the usefulness of the many therapeutic measures employed in this condition is difficult because in single infections spontaneous death of the larvae may occur within ten days after penetration of the skin and others may survive as long as 55 weeks. Moreover, intermittent periods of inactivity of larvae seem to be a common occurrence. Indeed, it has been observed that in a single infection of an individual patient, some larvae may travel vigorously whereas others remain dormant for periods of up to six weeks. Evaluations of therapeutic agents in this condition, therefore, must be based upon sufficient data to exclude the possibility of natural death of the larvae, and the observations must be continued for six weeks or more in order to preclude the possibility of larval dormancy instead of death.

Whipworms. **Phthalofyne**, 3-methyl-1-pentyn-3-yl sodium phthalate, has shown considerable promise as a trichuricide for dogs. In preliminary trials by Ehrenford,[87] all of the whipworms were removed from eight of nine dogs that were given the drug at a dose rate of 200 mg. per kilogram of body weight. The efficacy of the treatment was based upon pretreatment fecal examinations and autopsy findings; no data were given with respect to the number of worms involved. Similar criteria of efficacy were employed by Burch[88] in trials with 100 dogs that were given the drug by two methods of administration. A single dosage of 250 mg. per kilogram body weight was given to 50 dogs that were withheld from solid feed for 24 hours and given a milk feeding about 12 hours before treatment. All whipworms were removed from 40 of 42 dogs (95%) that retained the drug; eight dogs vomited and none of these animals were free of whipworms on postmortem examination. In another group of 50 dogs, the animals were not fasted but were given two doses of the drug, at the rate of 200 mg. per kilogram body weight, about eight hours apart. A small amount of feed was given in each instance shortly before medication. In these trials, three dogs vomited but all whipworms were removed from 44 of the remaining 47 animals (93%). Favorable results have also been reported with the treatment by Jordan,[89] Magrane,[90] and Greene and Gruesser[91] on the basis of fecal examinations before and after treatment.

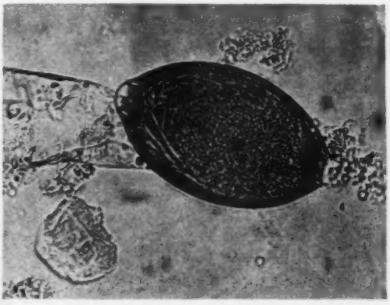
In critical trials conducted at the Agricul-

®[6]American Cyanamide Co., Fine Chemical Div., Pearl River, N. Y.
®[7]Chas. Pfizer & Co., Brooklyn, N. Y.



Severe canine whipworm infection of the large colon of the dog.

tural Research Center, three dogs were given the drug at a dose rate of 200 mg. per kilogram body weight after a fast of 24 hours; the dogs refused a feeding of milk that was offered about 12 hours before treatment. The chemical removed less than 2% of 702 whipworms from the three dogs; and none of the animals was free of these parasites at autopsy seven days after treatment. In subsequent trials, the single



Ovum of the whipworm of the dog, *Trichuris depressiuscula*, enlarged 400 times.—Benbrook.

250-mg. dosage, suggested by Burch,[88] was given to six dogs after a fast of 24 hours; the animals were given milk 12 to 16 hours before treatment. The chemical removed 25% of 636 whipworms from the six dogs; and none was free of whipworms when autopsied six to eight days after treatment. The two-dose method was more successful in trials with ten dogs. In this group, the drug removed 87% of 475 whipworms, and six dogs were free of the worms when autopsied seven or eight days after treatment.

It appears from the results obtained in our trials that more critical data are needed with the one-dose method before the efficacy of the regimen can be definitely established. The two-dose method, however, seems to show considerable promise.

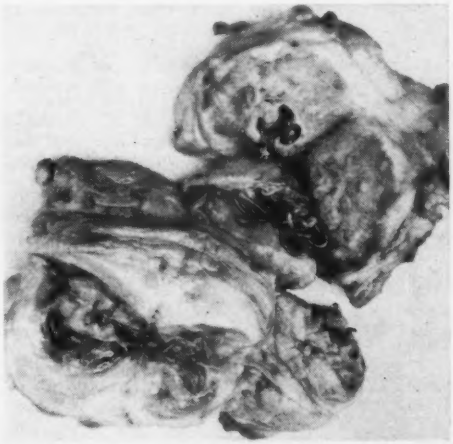
The mode of action of phthalofyne has not been determined; but in this connection, the report by Hoekenga[92] that the oral dose of the drug is equally effective when given intravenously to dogs is of particular interest. Accordingly, this investigator suggests the possibility that oral doses of the chemical also act systemically rather than by a direct effect on the worms in the intestine.

Lungworms. In limited trials reported by Sudduth[93] in 1955, a 20% solution of sodium iodide showed promise of effective action against the cat lungworm, *Aleurostrongylus abstrusus*. Three 2.5-cc. doses of the solution were given intravenously at five-day intervals. The treatment was well tolerated, prompt clinical response was noted, and no larvae were found in the feces three days after the last injection. Moreover, there was no recurrence of the larvae in the feces of one cat that was examined three and five months after treatment.

In 1954, Malherbe[94] reported the successful treatment of *Filaroides osleri* infections of dogs with weekly intravenous injections of either lithium antimony thiomalate or stibophen. With each drug, single injections of 5 cc. each were given for nine to 12 weeks to Bull Mastiffs weighing from 30 to 45 kg. There were no indications of toxicity. A combination of either of these two drugs and diethylcarbamazine, given daily for seven days was also effective; but there was greater risk of intoxication. Diethylcarbamazine was not effective when used alone.

Esophageal Worms. In clinical trials reported by McGaughey[95] in 1950, diethylcarbamazine was effective in alleviating the symptoms associated with infestations of *Spirocerca lupi*, namely, vomiting, retching, dysphagia, coughing, increased respiration, and elevated temperature. The drug was given daily at a dose rate of approximately 10 mg. per pound of body weight until symptoms disappeared, generally in four to ten days. Similar results with the chemical have been reported by Rao[96] and Vaidyanathan.[97]

Intestinal Threadworms. In a case report by Casler[98] in 1954, diethylcarbamazine was apparently effective in controlling a Strongyloides infection in one dog. The chemical was given at a dose rate of 50 mg. per pound of body weight, divided into five doses, for ten



Tumorous growth containing adult worms of *S. lupi* incised. The larger of these open into the lumen of the esophagus.

consecutive days. There was no evidence of intoxication, and the larvae disappeared from the feces after six days. The feces remained free of larvae when examined at weekly intervals for one month after completion of the treatment. In previous trials with the same animal, however, the drug was not effective when given at a dose rate of 40 mg. per pound body weight in single and divided doses for four to six days. Moreover, various dosages of diethylcarbamazine were ineffective against this parasite in trials reported by Burch and Ehrenford[99] in 1953.

Conclusions

A consideration of some of the more recent developments in anthelmintic medication of domestic animals and poultry suggests that the following items are of particular interest: Horses — piperazine derivatives, toluene; cattle — extended uses of phenothiazine, piperazine adipate; sheep and goats — diethylcarbamazine, emetine hydrochloride, hexachloroethane, various arsenates; swine — cadmium salts, piperazine derivatives; poultry — di-n-butyl tin dilaurate, piperazine derivatives; and dogs and cats — phthalofyne, piperazine derivatives, toluene, dichlorophenarsine hydrochloride, thiacetarsamide, chymotrypsin, lithium antimony thiomalate, sodium iodide, anthelin, dichlorophen, quinacrine hydrochloride.

REFERENCES

7. Sloan, J. E. N., Kingsbury, P. A., and Jolly, D. W., Preliminary Trials with Piperazine Adipate as a Veterinary Anthelmintic. *Jour. Pharm. and Pharmacol.*, 6:718, 1954.

66. Link, R. P., and Smith, J. C., Treatment of Canine Tapeworms with Atabrine. *Jour. Am. Vet. Med. Assn.*, 125:461, 1954.

67. Halawani, A., Baz, I., Hafez, A., and Shawarbi, M. K., Treatment of Tape Worms with Atabrine. *Jour. Roy. Egyptian Med. Assn.*, 31:956, 1948.

68. Kartsonis, P. L., and Austin, J. A., Anthelin—A New Compound for Removing Tapeworms and Roundworms from Dogs. *Jour. Am. Vet. Med. Assn.*, 116:301, 1950.

69. Craige, A. H., Jr., and Kleckner, A. L., Teniacidal Action of Di-phenthane-70. *N. Am. Vet.*, 27:26, 1946.

70. Blair, H. E., Vermiplex, a New Anthelmintic for Dogs. *N. Am. Vet.*, 30:306, 1949.

71. Otto, G. F., The Treatment of Canine Filariasis. *Auburn Vet.*, 8:2(2), 1952.

72. Soltys, A., Use of Enzymes in Heartworm Therapy. *Vet. Med.*, 51:187, 1956.

73. Foley, R. J., The Treatment of Canine Filariasis. *Vet. Med.*, 45:485, 1950.

74. Ziegler, C. G., Treatment of Canine Filariasis with Caricide, Diethylcarbamazine. *Jour. Am. Vet. Med. Assn.*, 116:209, 1950.

75. Garnier, W., A Progress Report on the Use of Caricide as a Preventive of Canine Filariasis. *Vet. Bull.* (Lederle), 13:13, 1954.

76. Kume, S., and Oishi, I., Treatment of Filariasis (*Dirofilaria immitis*). *Jour. Japanese Vet. Med. Assn.*, 5:358, 1952.

77. Stueben, E. B., Incidence of Infection of Dogs and Fleas with *Dirofilaria immitis* in Florida. *Jour. Am. Vet. Med. Assn.*, 125:57, 1954.

78. Nielson, L. B., Canine Filariasis in Canada. Report of a Case. *Canadian Jour. Comp. Med.*, 18:370, 1954.

79. Newton, W. L., and Wright, W. H., The Occurrence of a Dog Filarid Other Than *Dirofilaria immitis* in the United States. *Jour. Parasitol.*, 42:246, 1956.

80. Kanegis, L. A., A New Treatment for Ascariasis in Dogs and Cats. *Jour. Am. Vet. Med Assn.*, 113:579, 1948.

81. Colglazier, M. L., and Enzie, F. D., Notes on Caricide as an Anthelmintic for Cats and Dogs. *Proc. Helminthol. Soc. Wash.*, 18:50, 1951.

82. Bradley, R. E., Crimmins, L. T., and Zweigart, T. F., Preliminary Studies on the Anthelmintic Properties of Piperazine Citrate in Dogs. *Jour. Am. Vet. Med. Assn.*, 128:393, 1956.

83. Mann, P. H., Harfenist, M., and de Beer, E. J., The Effectiveness of Piperazine Citrate Against Intestinal Helminths of the Cat and Dog. *Jour. Parasitol.*, 41:575, 1955.

84. Enzie, F. D., and Colglazier, M. L., Toluene (Methylbenzene) for Intestinal Nematodes in Dogs and Cats. *Vet. Med.*, 48:325, 1953.

85. Brown, H. W., Mann, P. H., and Fratta, I., The Effectiveness of Antibiotics Against Intestinal Helminths of the Cat. *Antibiotics and Chemotherapy*, 3:243, 1953.

86. Loewenthal, L. J. A., Evaluation of Therapy in Creeping Eruption. *Australian Jour. Dermatol.*, 2:171, 1954.

87. Ehrenford, F. A., A New Effective Anthelmintic for Canine Trichuris. *Jour. Parasitol.*, 40:481, 1954.

88. Burch, G. R., A New Oral Anthelmintic for Canine Whipworms. *Vet. Med.*, 49:291, 1954.

89. Jordan, J. E., Treatment of Canine Whipworms (*Trichuris vulpis*) with Whipcide. *Jour. Am. Vet. Med. Assn.*, 126:220, 1955.

90. Magrane, H. J., Jr., Treatment of Canine Trichuriasis with Whipcide. *N. Am. Vet.*, 35:761, 1954.

91. Green, L. E., and Gruesser, F., Canine Whipworm Treatment with Whipcide. *Michigan State Coll. Vet.*, 15:42, 1954.

92. Hoekenga, M. T., Ocular Toxicity of Whipcide (3-methyl-1-pentyn-3-yl Acid Phthalate) in Humans. *Jour. Am. Med. Assn.*, 161:1252, 1956.

93. Sudduth, W. H., Lungworm Infection in Cats and Its Possible Treatment. *Jour. Am. Vet. Med. Assn.*, 126:211, 1955.

94. Malherbe, W. D., The Chemotherapy of *Filaroides osleri* (Cobbold, 1879) Infestation in Dogs: A Progress Report. *Jour. South African Vet. Med. Assn.*, 25:9, 1954.

95. McGaughey, C. A., Preliminary Note on the Treatment of Spirocercosis in Dogs with a Piperazine Compound Caricide (Lederle). *Vet. Rec.*, 62:814, 1950.

96. Rao, D. S., Paramanand, Spirocercosis in a Dog. *Indian Vet. Jour.*, 29:548, 1953.

97. Vaidyanathan, S. N., *Spirocerca lupi* Infection in Dogs. A few Cases Treated with Hetrazan (Lederle). *Indian Vet. Jour.*, 29:244, 1952.

98. Casler, W. F., Canine Strongyloidiasis. *Michigan State Coll. Vet.*, 15:38, 1954.

99. Burch, G. R., and Ehrenford, F. A., Canine Strongyloidiasis. *Vet. Med.*, 48:417, 1953.

Combined Thyroid–Androgen–Estrogen Therapy In Canine Practice

JAMES G. GREENE, D.V.M., Passaic, New Jersey

THE veterinary practitioner has a never ending challenge to constantly improve existing methods of therapy. Two excellent examples of this are the management of (a) younger dogs convalescing from virus infections, and (b) the older or geriatric patient.

Our methods in handling these two different types are somewhat different, but objectives are identical. Objectives with all therapy is to permit speedier recovery and maintenance of good health.

Some dogs pose the problem of premature aging. As early as five years of age it may be necessary in some cases to counteract the effects of aging and the manifestations associated with it. Some of these are poor coat, lack of interest in life, muscular weakness, incoordination, urinary incontinence, malnutrition, and others. This picture is analogous in many respects to the aged human patient.

It is interesting to observe that physicians are successfully managing many of these problems with products having similar combination.[1,2] It is also of interest to note the factors which influence anabolism and catabolism.[3,4,5]

Clinical Study

This study was undertaken to evaluate this method of therapy in cases where prognosis is questionable or unfavorable. Methods of counteracting mental depression or lack of interest in life are of paramount importance since this is often a primary factor in achieving successful end results.

The product selected for evaluation was known as anabolin®[1]. Each tablet contained methyltestosterone 2.5 mg., ethinyl estradiol 0.005 mg., and proloid®[2] ¼ gr.

All animals were closely observed during therapy as well as after treatment to study recurrences or other factors. A review of the combination used (thyroid-androgen-estrogen) indicates that the following advantages may be derived as a result of such therapy.

®[1]Warner-Chilcott Laboratories, Morris Plains, N. J.
®[2]Thyroglobulin — Warner-Chilcott Laboratories, Morris Plains, N. J.

Methyltestosterone is much more active than testosterone when given orally. Like all androgens it has a marked anabolic activity. Administered to debilitated patients with a negative nitrogen balance, it arrests and reverses wasting of muscle and other tissue by improving dietary nitrogen. Also through restoration of the calcium balance to normal, osteoporosis is combatted. A desirable gain in strength and vigor usually results.

Ethinyl estradiol acts synergistically to enhance the anabolic effects of methyltestosterone. Recent studies suggest that estrogens may retard deposition of fat in the arterial linings (intima) and forestall or delay atherosclerosis, by improving the fat (cholesterol/phospholid) transport mechanisms of the blood.

Proloid and thyroid U.S.P. are prescribed in the same dosage, grain for grain. Thyroid hormones are vital speed regulators, influencing every cell in the body. At the level used, it serves as an anabolic agent. Small amounts of thyroid hormone seem to exercise synergistic effects with other hormones, although the mechanism of this assumed synergism is not clear.

Report of Cases

This study included 50 selected cases, all dogs. These were divided into group A and B. Group A included 35 animals classified as geriatric types. Their ages varied from 8 to 12 years. All cases had pronounced symptoms of old age which included indigestion, lack of appetite and vigor, obesity, mental depression, lack of interest in life, urinary incontinence, posterior weakness, alopecia, poor teeth, poor coat and condition.

Group B included 15 cases, all of which were less than two years of age and convalescing from virus infections, distemper, hepatitis, etc. All dogs showed little interest in life. They had anorexia, poor coat, poor condition and were thin. This group was started on the metabolic regulator after the febrile stage of the virus infection.

Dosage

Dosage for the average size animal was one tablet daily. The larger dogs received two tablets daily. Results in most cases were observed within 7 to 10 days. Some animals steadily improved over a several week period. The comments and impressions of the owners were quite gratifying. Recurrence was observed in only five cases and these quickly subsided under continued therapy. Tolerance was excellent. In most cases, the young group (B), the metabolic regulator served as an adjunct to recognized methods of therapy. In the older group (A) if no organic problem was present it was used alone.

Our results were satisfactory in over 95% of the cases tested. Evaluation was based on tonic effect, increase in muscle tone and vigor, interest in life, correction of urinary incontinence, speed of recovery if disease was involved, correction of faulty hair coat, and a restoration of a sense of well-being. If treatment was continued at home, comments of the owners were taken into consideration. We often received comments such as, "He acts like a puppy"; "He feels like himself again"; "He has shown more interest in life than he has for some time," etc.

Summary

A metabolic regulator identified as anabolin was evaluated in 50 dogs. Thirty-five of these were over eight years of age, and 15 were under two years. Results in over 95% of the cases were favorable. Generally, results were noted in one to two weeks. A few cases had recurrences which immediately subsided when therapy was again initiated. Tolerance was excellent. Response was measured by correction of the problem at hand. An important guide was the favorable comment of owners. Products of this type can play an important role in our knowledge and advancements particularly in the field of geriatrics. Continued therapy in certain cases over an indefinite period of time seems in order.

REFERENCES

1. Harrison, T. R., Principles of Internal Medicine, 2nd ed., New York, 1954.

2. Hellbaum, A. A., Paper presented at Pan-American Congress of Geronotology, Mexico City, Sept. 15-19, 1956.

3. Dukes, H. H., The Physiology of Domestic Animals, 6th ed., Ithaca, N. Y., Comstock Publ. Assoc., 1953.

4. Bild, C. E., Oral Rehabilitation of Dogs, *Jour. Am. Vet. Med. Assn.*, 129:299, 1956.

5. Maynard, L. A., Animal Nutrition, 2nd ed., New York, McGraw-Hill Book Co., 1947.

Veterinary Ophthalmology: A Practitioner's Perspective

W. E. TAYLOR, D.V.M., Rahway, New Jersey

Veterinary ophthalmology is confined principally to the treatment of traumatic, allergic, or infectious conditions of the eyelid, conjunctiva, cornea, and adjacent structures. Restraint problems and economic feasibility have limited routine practice of many desirable technics. Progress in medical research has brought fresh and almost revolutionary therapeutic concepts. Chemical and pharmaceutical research have resulted in advanced drug tools, contributing to more effective therapeutics. Practice is becoming ever more interesting and challenging. Personal satisfaction and more favorable client relationships accrue as natural sequellae.

The veterinarian can develop an enviable degree of clinical proficiency. He has the academic background including an understanding of topographical anatomy and physiology of the area, knowledge of the inflammatory process, the pathogenesis and pathology of infection. Experience and perspective can be gained by applying knowledge acquired to every case presented. In addition, one must keep abreast of current therapeutic rationale. A judicious selection of proved technics and employment of the newer tools of clinical medicine frequently produce spectacular response in diseases of the eye.

A discussion of surgical technics is beyond the scope of this paper. My experience would add little worthwhile information to the well-described procedures found in many texts. Current literature and discussion of papers at veterinary meetings guide development of necessary variations in procedure to fit particular cases. We have found preoperative preparation and postoperative management greatly simplified by use of the antibiotic—metisteroid preparations. Local anesthesia is accomplished by infiltration of the usual procaine-epinephrine solutions or by topical applications of such agents as butyn®[1] or nupercaine.®[2]

Preparation and Treatment

After examination and diagnosis we find it desirable to prepare the eye for medication. A cleansing or antiseptic solution is used to

®[1]Abbott Laboratories, North Chicago, Ill.
®[2]Ciba Pharmaceutical Products, Inc., Summit, N. J.

flush the conjunctiva to remove inflammatory exudates or foreign particles. Flushing agents should be bland and used lukewarm. Boric acid, 2%, physiological saline, or an alkaline wash serve well and the choice is a matter of personal preference.

Clinically, treatment is classified according to therapeutic objectives. It is not oversimplification to state that efforts are essentially attempts to combat inflammation, eliminate infection, and promote healing of damaged tissue. Therapy may include one or any combination of agents to accomplish these objectives.

From the standpoint of inventory control and, most importantly, clinical efficacy, we are most grateful that sulfonamides, antibiotics, and the "Meti" steroids have replaced the myriad older preparations. Singly or in combination they permit specific therapy of inflammation and infection. It is natural to discuss treatment of inflammation and infection as a joint entity because one seldom sees one without the other.

Sulfonamides are effective against a majority of pathogens that attack the eye. These drugs penetrate into tissues surrounding the conjunctival sac. Sulfonamides are essentially bacteriostatic and act by altering or blocking metabolic enzyme systems of bacteria. They do not alter function of leukocytes but unfortunately are inhibited by pus. In our experience, foreign protein injections often enhance response to sulfonamide therapy. While several sulfonamides may be used in the eye sulfacetamide is the drug of choice. By substantial documentation it is accepted as being the least irritating to ocular tissue.

Antibiotics have made an invaluable contribution to ophthalmology. Culture and sensitivity tests on ocular pathogens are not run in our practice so that broad-spectrum antibiotics, such as neomycin or the tetracyclines, are preferred. Selection of dosage form is a matter of choice. For suppression of inflammatory processes, no drug has served as well as prednisolone. The acetate salt incorporated into ointment or drops affords a dramatically effective agent. In addition to suppressing inflammation it apparently effects clinical dissolution of early lesions of inflammation. It is a studied opinion that inflammation must be suppressed for other drugs to be most effective, to inhibit production of exudates, and to permit healing with minimal scar formation. As an example, differences among practitioners in treating ulcerative lesions are many in theory and practice. However, acute ulcers of four or five days duration have responded remarkably well to a suspension of prednisolone and sodium sulfacetamide. Since prednisolone, by topical application, will penetrate into the anterior chamber of the eye as well as into structures adjacent to the conjunctival sac, topical therapy is usually sufficient in these instances. Further therapy is dependent on the general state of nutrition of the patient, presence of other disease conditions, and age.

Results using combinations of these drugs in accordance to this rationale have given more satisfactory results than were thought possible a decade past.

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WHO on Rabies

Since the third report of World Health Organization's Expert Committee on Rabies is not usually available to many of the readers of this page a verbatin synopsis is, in part, reproduced herewith:

"Additional field experience confirms the laboratory observations that LEP (low egg passage) Flury chicken-embryo vaccine produces excellent immunity in dogs for at least three years following a single intramuscular inoculation (posterior thigh muscles). A single inoculation of the Kelev strain vaccine confers good protection in dogs, but the duration of immunity beyond one year has not yet been ascertained.

"In areas where chicken-embryo vaccine is not available or is impractical, the use of a single dose of nervous-tissue vaccine is recommended. Potency-tested nervous-tissue vaccine confers good immunity for one year, and there is still significant protection three years after vaccination by the intramuscular route.

"The Committee urges that all dogs three months of age and over be vaccinated; the vaccination of dogs less than three months of age is not recommended."

In reference to the immediately preceding paragraph, there is a footnote as follows: "In rabies-infected areas puppies under three months of age should be kept indoors or restrained. Where it is important that puppies under three months of age be vaccinated, inactivated vaccine is recommended, with revaccination after three months of age with any type of vaccine."—*R. R. Dykstra, D.V.M.*

Animal Mummies

Although ancient Egyptians were generally irrational as therapists they were truly advanced in the use of herbs and other preservatives to prevent body decay. Not only was the body of man preserved for all posterity, but the bodies of animals as well. Arabic for "body preserved by wax or bitumen" was "mumiyah," and the preserved body itself was called a "mummy."

When a sacred Apis bull died, it was embalmed, surrounded by jewels, placed in a huge granite sarcophagus, and hidden in an immense subterranean vault. Other animals including jackals, lizards, gazelles, ibis, falcons, crocodiles, fish, dogs, cats, cuckoos, snakes, hawks, owls, baboons, sheep, insects, and even joints of meat and trussed fowl were mummified and provided with form-fitting coffins. They were then buried in large cemeteries devoted to particular species.

Today, these animal mummies are not easy to examine. Layer upon layer of hardened resinous bandages must be chipped away. The systematic study of animal-mummification practices has not been made, but we know they were not embalmed carefully; main effort was put into the pleomorphic coffin, rather than in what lay hidden underneath. The shape of the bandaged mass was supposed to indicate the contents, but some animal "mummies" have been found to be only bandages, with no body within the multifold wrappings.

Egyptian embalming practices more than mirror prevailing philosophy in that country throughout antiquity, and superstitions inspired by these practices can not be said to be dead today. More than one black cat legend may have had its origin with the sacred black cat of the Oagans.

During the reign of Sheshonk, the first king of the Libyan 22nd Dynasty, Bast — a black cat — became not only a Goddess in Egypt, but also the official Diety of the kingdom. Then as now, fortune followed those who paid proper homage to the official god. Embalming of cats was not a neglected art, although craftsmen of that era could hardly have suspected that someday the *x*-ray camera would open their indelicate workmanship to public scrutiny.—*Kenneth B. Haas, D.V.M.*

Reproduction from x-ray of a cat mummy, probably B. C. 4000.

Oral And Parenteral Albamycin® Therapy In Cats

LEWIS K. TODD,* D.V.M., and HOWARD L. WRIGHT,* D.V.M., Tacoma, Washington

THE need to continue the search for more effective antibacterial agents for use in veterinary medicine is apparent. Of the newer antibiotics, albamycin (novobiocin) has recently become available for evaluation in animal patients. To date, only one other report on this antibiotic has appeared in veterinary literature, and this concerned oral use in dogs and cats.[1] The present report, summarizing experience with use of the antibiotic since October, 1955, restricts itself to application of oral and parenteral albamycin in feline patients, and presents 15 representative cases.

Characterization

Source. Streptomyces niveus nov. sp.[2,3]

Spectrum. Gram-positive and some Gram-negative bacteria, including *M. aureus, Str. hemolyticus, D. pneumoniae, Pr. vulgaris, Past. multocida, Sal. typhosa,* and *K. pneumonia.* Especially active against *M. pyogenes var. aureus.* No cross-resistance with penicillin, chlortetracycline, oxytetracycline, tetracycline, streptomycin, chloramphenicol, or erythromycin.[4]

Stability. Sodium salt slowly soluble in water, but dissolves readily in supplied sterile diluent.

Resistance. In vitro studies indicate that *M. pyogenes var. aureus* may develop resistance to albamycin, as with other antibiotics.[4]

Toxicity. Relatively low order. Does not cause kidney or liver damage. Only minor alterations noted after 62 day chronic studies in dogs and 72 day chronic studies in cats.[5]

Pharmacology

Albamycin administered orally is rapidly absorbed, producing peak concentrations in the blood within two or three hours that on an equivalent weight basis are approximately ten times higher than those produced by tetracycline, 25 times higher than those produced by erythromycin, and 50 times higher than those produced by penicillin. High blood levels are present at eight hours, and detectable amounts remain in the serum for as long as 24 hours.

Albamycin administered intramuscularly is also rapidly absorbed, producing peak concentrations in the blood within two or three hours. High blood levels are present at eight hours, and detectable amounts remain in the serum for as long as 24 hours. Administered intravenously, there are immediate high levels.

When appreciable amounts are present in the serum, the antibiotic diffuses into pleural and ascitic fluid. Albamycin appears to be concentrated in the liver and excreted in the bile, feces, and urine. The concentration in the bile is approximately 16 times that in the serum and urine. Approximately one-third of an orally administered dose is accounted for as biologically active material in the feces. About 1/100th is present in the urine.

Case Reports

Pertinent data on 15 representative feline patients are presented in table 1. Patients' ages ranged from three months to six years, weights from 4 lb. to 9½ lb. Conditions treated included: Septicemia associated with abscess (1), acute nephritis (1), panleukopenia (7), pneumonitis (4), and stomatitis (2).

Initial albamycin therapy was usually by intramuscular injection, incorporating the appropriate dose in 0.5cc. of diluent. In several patients the intramuscular dose was divided over the course of a day. The total daily intramuscular dose was approximately 10 mg./kg. (2.2 lb.).

Continuing therapy usually consisted of oral albamycin at approximately 30 mg./kg. in divided doses, daily.

Response was excellent in most cases, temperatures returning to normal within 24-48 hours after initiating therapy. Total doses of albamycin administered during the course of therapy ranged from 40 to 1200 mg. Average course of therapy was four days. Beneficial effects in the diseases of viral origin must be attributed to control of secondary invaders rather than to any specific antiviral effect. As noted on the table, three cases unresponsive to other antibiotics demonstrated response to albamycin therapy.

®Trademark, Reg. U. S. Pat. Off., for The Upjohn Company brand of novobiocin.
*Lakewood Veterinary Hospital.

TABLE 1. Oral and Parenteral Albamycin Therapy in Cats

Age (Yr.)	Diagnosis	Wt. (Lb.)	Dose	No. Days Treated	Total Dose (mg.)	Response	Comments
6 mo.	Panleukopenia, febrile	—	15-20 mg./kg. (1 cc.) U.I.D. IM	4	200	Temp. normal 48 hr., complete recovery	
1	Panleukopenia, febrile	—	15-20 mg./kg. (1 cc.) U.I.D. IM	4	200	Temp. normal 48 hr., complete recovery	
8 mo.	Panleukopenia, febrile	—	15-20 mg./kg. (1 cc.) U.I.D. IM	3	150	Temp. normal 24 hr., complete recovery	Previous tetracycline therapy.
3 mo.	Panleukopenia, moribund	4	25 mg./kg. U.I.D. IM	1	40	Died 18 hr.	
—	Abscess, septicemia, febrile	—	50 mg. (1 cc.) U.I.D. IM	3	150	Temp. normal 48 hr., complete recovery	Previous penicillin-streptomycin therapy.
5	Virus pneumonia febrile (Pneumonitis)	9	20 mg./kg. U.I.D. IM	4	328	Temp. normal 36 hr.	Previous tetracycline therapy.
1.5	Necrotic stomatitis	7	20 mg./kg. U.I.D. IM	3	186	Temp. elevation	Used penicillin-streptomycin therapy.
6 mo.	Panleukopenia, febrile	6.5	10 mg./kg. B.I.D. IM (0.5 cc. daily)	3	225	Temp. normal 36 hr.	Treatment prolonged because of protracted inappetance.
3	Virus pneumonia, febrile (Pneumonitis)	7	20 mg./kg. IM	3	150	Temp. normal 24 hr.	
6	Pneumonitis, T. 105	7	17 mg./kg. 17 mg./kg. Q.I.D. orally	4 5	1200	Temp. normal 48 hr.	Released on oral albamycin. Rec'd B-complex, saline-dextrose.
6	Panleukopenia, T. 106.4	5	20 mg./kg. U.I.D. IM	4	160	Temp. normal 36 hr., complete recovery	
8 mo.	Panleukopenia, T. 106.2	6	20 mg./kg. IM U.I.D.	3	150	Temp. normal 24 hr., recovery	Released on oral albamycin.
7	Ulcerative stomatitis	9.5	15 mg./kg. U.I.D. IM	10	600	Recovery	Received B-complex, saline-dextrose.
4	Acute nephritis, T. 105	7.5	17 mg./kg. U.I.D. IM	3	150	Temp. normal 24 hr., complete recovery	
8 mo.	Early pneumonitis, T. 103	7	18 mg. kg. IM 18 mg. /kg. Q.I.D. orally	3 4	950	Temp. normal 24hr., complete recovery	Released on oral medication, continued to cough for one week.

REFERENCES

1. Haas, K. B., Connor, N. D., and Davidson, J. L., Oral Use of a New Antibiotic In Dogs and Cats. *Vet. Med.*, 51:581 (Dec.), 1956.

2. Smith, C. G., *et al.*, Streptonivicin, A New Antibiotic: I. Discovery and Biologic Studies. *Antibiotics & Chemotherapy*, 6:135 (Feb.), 1956.

3. Hoeksema, H., *et al.*, Streptonivicin, A New Antibiotic: II. Isolation and Characterization. *Antibiotics & Chemotherapy*, 6:143 (Feb.), 1956.

4. Wilkins, J. R., Lewis, C., and Barbiers, A. R., Streptonivicin, A New Antibiotic: III. *In Vitro* and *In Vivo* Evaluation. *Antibiotics & Chemotherapy*, 6:149 (Feb.), 1956.

5. Larson, E. J., *et al.*, Novobiocin, A New Antibiotic: VI. Toxicology. *Antibiotics and Chemotherapy*, 6:226 (Mar.), 1956.

6. Taylor, R. M., Miller, W. L., and Vanderbrook, M. J., Streptonivicin, A New Antibiotic: V. Absorption, Distribution and Excretion. *Antibiotics & Chemotherapy*, 6:162 (Feb.), 1956.

7. Personal communication, The Upjohn Company, Kalamazoo, Michigan.

Certificates for Dog Show Entries

Kennel clubs in general have regulations prohibiting the entry of spayed females in breed show competition. The operation is now so skillfully performed by veterinarians that, at least in animals spayed at an early age, presence of a laparotomy scar is only faintly visible. In the course of time, failure to exhibit estrum is an outstanding effect but even entire females may not show this for several months. The judge in the show ring has not time to make a detailed examination and he may lack the technical skill. It seems that veterinarians could be helpful by the use of an ear tattoo of a distinguishable nature; also issue a certificate to the owner that the animal has been unsexed. Appropriate certificates for the cryptorchid could also be furnished.—*R. R. Dykstra, D.V.M.*

Statistics on Pets

All-Pets Magazine, a monthly publication prepared largely for breeders and fanciers has correlated statistical material resulting from a survey of 14 leading consumer magazines. In this is revealed that 55.6% of all the families in the United States have a pet of one kind or another.

Numbers of pets in American homes is estimated as follows:

Dogs	25,000,000
Cats	26,700,000
Parrakeets	15,000,000
Canaries	6,000,000
Finches (and other caged birds)	1,000,000
Skunks	10,000
Turtles	3,000,000
Monkeys	100,000

Also included in the release is the opinion expressed by the editors that for every 20,000 persons in new urban areas, a veterinarian who specializes in small animal medicine and surgery is needed.

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Vomiting after Administration of Anthelmintics

Vomiting following administration of a number of anthelmintic preparations has posed a clinical problem for practitioners specializing in pet animal practice. Redosing after vomiting is hazardous especially when agents have narrow margins of safety.

In considering chlorpromazine (thorazine®) as an antiemetic, Estrada (*Jour. Am. Vet. Med. Assn.*, 128:292 [Mar. 15], 1956) states that parenteral injection of 1 mg. per lb. body weight one hour prior to anthelmintic treatment effectively prevented vomition of the anthelmintic given orally. It did not interfer as far as could be determined clinically, with purging action of the anthelmintic.

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Pets Magazine is authority for the estimate of 15,000 cat breeders (fanciers) in the United States. This same firm states that they have the names of 6,000 catteries on their mailing list.

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Public opinion has always held and holds now that rabies is essentially a disease of dogs. Actually rabies must be considered as a disease of mammals, including man.

®Smith, Kline, and French Laboratories, Philadelphia, Pa.

Canine Distemper Virus in Ferrets

Evidence is presented by Larin (*Jour. Comp. Path.*, 65:323, 1956) that the virus of canine distemper is not a homogenous virus. Its behavior is claimed to be unpredictable and changes as variants occur, some of which appear as biological entities.

The authors reports studies of 55 strains of the virus of Carré isolated in Britian and found virulence changes on passage. Some variants produced no immunity to others.

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Rabies Control in Los Angeles County, California

Comparison of the number of cases of confirmed rabies in Los Angeles, Calif. and vicinity for 1955 and 1956 indicates a significant decrease which occurred simultaneously with the accelerated vaccination program. Reports from the Los Angeles City Health Department state that no animal rabies have occurred there since Thanksgiving of 1956.

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Correction

Reference is made to errors in article entitled Operative Procedure for Spaying Cats prepared by Dr. Mark Sternfels. appearing on page 299 of the June 1957 issue.

The author's original manuscript indicated that the procedure described was "standard" in his practice and should have been so designated in the title. Furthermore, the editors regret the error in designating "intraperitoneal" injection of the indicated anesthetic agent "between the seventh and eighth rib." The author makes injection intrathoracically between the seventh and eighth rib by means of a short, small gauge needle, and claims such injections are safe and effective when care is used.

Error in the surgical site also was drawn to the editor's attention. The author described this as a "three inch square area anterior to the angle of the hip" and not at the anterior angle of the flank as was printed.

No excuse is offered for these regrettable errors. Our apologies to both the author and our readers.

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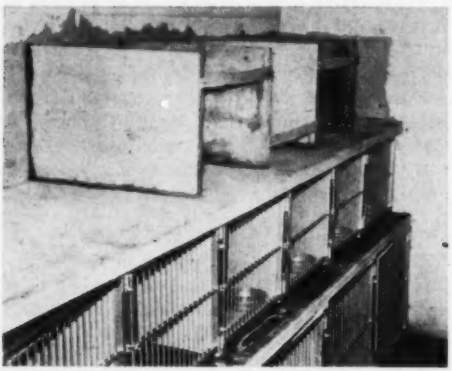
Corneal tissue of the human eye, generally considered to be one of the most fragile of specialized body tissues, has been successfully preserved for as long as two years. Removed soon after death of donors, cornea is dehydrated in glycerin and stored at room temperature in vacuum-sealed tubes.

CLINIC

CLIFFORD L. McGINNIS, D.V.M.
Peoria, Illinois

A Practical Cage for Small Animals

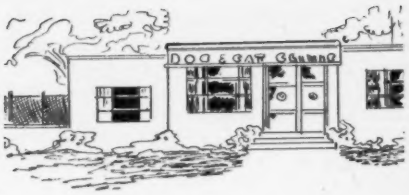
It seems desirable to discuss in this column construction of a battery of low cost cages for housing dogs. It takes a lot of patients to pay for a $75. cage, whereas a $10. one will look attractive and be as satisfactory. This is how we built a battery for the new addition in our hospital.



First, we like cages that drain to the front. We have enough exercise pens to facilitate turning out 14 dogs at once. When dogs are exercised, cages are washed or hosed out twice daily. An 18 in. heavy duty window squeegie, equipped with three instead of two rubbers is used to remove excess water, and the cage can be wiped dry if desired. The bottom tier of cages is elevated off the floor by about 2 in. Adequate floor drains are provided. A small trough is constructed in front of each cage door of the second tier, and water or urine may be sponged up or raked out with the squeegie and flushed through the floor drain.

How to Build

Pour the cement floor for the first tier of cages, giving it a substantial forward slope for ready drainage. For the partitions, use a precast slab of concrete made out of pea gravel, sand, and cement. These will be 2 in. thick. To precast these partitions, build several forms, using plywood for the base, and frame them with 1 in. material cut 2 in. wide.



In the end of the slab that will face front, set two ⅜ in. bolts 6 in. long so that the treads barely show through the wood. These are for hanging the gate. Cages will now measure 36 in. by 32 in. with bolts inserted. Next coat the plywood with any kind of oil to keep the cement from sticking when the form is ready to be removed. First make a mortar of cement and sand, and butter the plywood ¼ in. thick. Now add the cement mix and trowel it smooth. Remove the form in four days. Both surfaces are smooth. These partitions need not be reinforced with rods or wire.

After completing enough partitions, arrange them on poured floor and mortar underneath and to the back wall so they are level and water-proof between cages.

Next, you have to build a roof for this tier. Use the same plywood to make a false ceiling in each cage, ¼ in. below the top of the partitions. Put some legs under each piece so it will not sag when the concrete is poured. Nail a 3 in. strip along the front of the battery to complete the form and then pour the concrete. This slab needs rods for reinforcing, for it is going to carry the second tier of cages that is set back 6 in. on the ceiling of the first tier, so before the cement is set up, work out a trough in front of each cage.

Next precast partitions for the second tier. These are 23 in. x 30 in. The same plywood and 2 in. material can be used for the forms. A third row of cages may be added if desired.

In a similar battery constructed in our hospital, we have nine lower cages with dimensions 36 in. by 36 in. x 32 in., and 12 second tier cages with dimensions of 26 in. x 30 in. x 23 in. The cost for materials including plywood, gravel, cement, and bolts, but excluding gates, was $48.60. The regular hospital help did the work on slack days.

Any paint store can give directions for painting new cement and when completed, a coat of paint should last a year. Repainting is inexpensive when the regular help does it and this also applies to keeping the cage doors painted with aluminum paint.

for durable immunity against these

2

Canine Distemper

Infectious Canine Hepatitis

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in early 19th century America, or it existed elsewhere prior to this time. Without discounting the possibility of a mutant virus rearing its ugly head, the established philosophy concerning spontaneous generation would point to the American menace having had European forebears.

A further ramification of this concept might have, in theory at least, a bearing upon the future of disease investigation. If all of the facts related to the outbreaks of disease in the past could be assembled, we would have a better basis for determining under what conditions a new outbreak of any particular disease might be anticipated. While it is logical that today principal attention is given to immediate causes where they are known, it is also well established that predisposing factors cannot be disregarded. A relatively rapid change in environment, *viz.* the establishment of large herds of swine to meet the demands of growing metropolitan areas, was undoubtedly a predisposing factor in the establishment of hog cholera as a disease of epizootic proportions. In other cases, climate, nutrition, et cetera, would have to be considered. In the great outbreak of rinderpest in England in 1865, a political expedient, the lifting of trade restrictions, was a decisive factor—one with freely predictable results.

The accumulation of such data could, therefore, become a major instrument in disease investigation. In the case of diseases which are relatively unknown today, it is mainly by accumulating the available facts from the past that this job can be done. And in the case of diseases which still present ample opportunity for such investigation today, their occurrence under conditions which may have been different in times past may still have value. Today, as in the past, certain geophysical factors must be considered in presenting the full picture of any particular disease problem. With the capacity of man to make major changes in his environment, as in large drainage or irrigation projects, the liklihood of the emergence of disease problems new to that area increases. And with a seemingly inevitable increase in radio-activity, locally or generalized, it would not seem wholly improbable that changes in the virulence of organisms might be encountered. Whether this would be by actual mutation to new forms, or merely by altering characteristics which would enable them to secure a firmer foothold, would be difficult to determine in advance. The important consideration, however, is that should such changes occur, it is more probable that these would be in the direction of a previously existing form rather than one completely new.

Cyclical Plagues

If history repeats itself, as it has since the beginning of recorded time, it seems inevitable that hog cholera, for example, is destined to become less of a problem sometime in the future than it has been in the past century. And while the steps that have been taken in the control of this disease have had demonstrable results, all of the major animal plagues have occurred and recurred in cyclical fashion when considered from the long view of history. If we have the confidence to believe, with Doctor Salmon (1879), that "if the contagious germs now in the state can be destroyed and their importation prevented, we shall be as free from it in the future as we were before its first importation," we may unwittingly create a second problem with the solution of the first. If freedom from hog cholera, or any other disease, should engender indifference to that freedom, it is inevitable that the disease will reappear, perhaps with a virulence unknown today. And unless history continues to be read, those who "discover" an outbreak of a "new" disease may give it a new name, unaware of its real identity.

As a matter perhaps more of passing interest than of real significance, Bradley's description of *the Choler* in hogs appears practically *in toto* in an early American veterinary publication. This is the Citizen and Countryman's Experienced Farrier (Baltimore, 1803) by J. Markham, G. Jeffries and experienced Indians. In 1764, the first edition of this work had been published in Wilmington with the same authorship, except that the Indians were merely "discreet" at this time. Jeffries was an American who had the bad judgment to present the inane babblings of the redoubtable Jarvis (Gervase) Markham, whose Maisterpeece (1610) was the bane of the veterinary profession for two centuries. How well either of these two American editions were received is a matter for speculation, but the fact that they are extremely scarce suggests that many were literally worn out by long use. At any rate, the unknown individual who "coined" the term "hog cholera" may have had a precedent at hand to guide his unfortunate choice of this indiscriminate term. The name, of course, has persisted despite the protests of its inadequacy by practically every scientific investigator who later wrote upon the disease.

The investigations of hog cholera between 1850 and 1900 are of particular interest in the annals of animal disease research. That the almost universal coexistence of a bacterial infection with the virus of hog cholera should have proved a major stumbling block to a speedy solution of the problem is understandable. The also nearly universal presence of parasites and other disease entities further clouded the situation. Under these conditions it is not unusual that different investigators should have come up with different answers, and, upon occasions, that they should have crossed swords. The salient events in this great controversy are sufficiently well known, however, that a review of them would not be pertinent at this time. The story has been recently and amply related in Bierer's Short History of Veterinary Medicine in America (1955).

In the case of a number of "simpler" diseases, it is not surprising that considerable progress could be made in their control and eradication, even without having identified the specific causative agent. But, as pointed out by Salmon, the crude technics of bacteriology in 1880 were not adequate for the investigation of hog cholera, and researchers were hampered by lack of proper support. In his summary of work on Hog Cholera (1889), Salmon states: "These difficulties were not fully appreciated either by the officials of the Department of Agriculture or by the stockowners of the country, for the reason that such investigations were new to them and their requirements but imperfectly understood. It was not expected that a chemist would go into a sorghum field and discover the proportion of cane sugar in the sorghum cane without apparatus or laboratory facilities, but it was expected that the veterinarian would make much more difficult and delicate investigations than these with no other aids than an ax, a butcher knife, a scalpel, and a microscope."

The Contagion Controversy

In spite of the difficulties in ascertaining the specific nature of hog cholera imposed by the lack of facilities and the complexity of the disease, the lack of unanimity in recognition of hog cholera as a contagious disease is a little baffling. In other epizootic diseases, such as pleuropneumonia and glanders, the existence of a contagion was readily established, and measures taken to combat them were based upon this premise. What is perhaps the first scientific report on hog cholera, which was based upon experimental evidence as well as observation, appeared in the *Medical and Chirurgical Review* for 1858. The author, George Sutton, M.D., of Indiana, states that when the disease first made its appearance in the summer of 1850, "it was not known at that time (July) that the malady was contagious," but that as "we saw it spreading from farm to farm, the question was suggested whether it did not spread by contagion." To test his idea, he set up a number of experiments to determine the mode of infection, and by November was able to state: "From these experiments I think that we not only ascertained that this disease was infectious, but that the infection had a latent period of from 12 to 15 days . . . The manner in which this disease in many instances spread among hogs from farm to farm also showed most conclusively that it was infectious . . . A large number of facts could be given, if necessary, to show the contagiousness of the disease."

But in 1861 the contagious nature of hog cholera was denied by E. M. Snow, M.D., in an article appearing in the USDA Report for that year. While he admitted the epizootic nature of the disease, he held that the cause was "an epidemic atmospherical poison." As late as 1879 wide differences of opinion were held by a group of medical men engaged by the Department of Agriculture to investigate the disease (Special Report no. 12, Diseases of Swine). While a number advocated contagion as a principal or sole mode of infection, others were inclined to doubt, or to deny outright its contagiousness. A Dr. A. S. Payne, in claiming that hog cholera was a fever, and as such was no different from fevers in man, stated categorically: "The theories of ozone, 'disease germs,' micrococci, etc., are very plausible in theory, but they have yet to be proven . . . The contagia of the plague and typhus, especially the latter, is denied by many. It seems probable that a disease may be contagious under certain circumstances and not so under others . . . Horses, hogs, cattle, and sheep are as susceptible to disease from exposure, to cold, rainy weather, and to sudden climatic alternations, as the human family; probably more so."

And taking another tack, Dr. J. N. McNutt averred, "I am satisfied that the real cause of the disease is the present manner of breeding, raising, and feeding the pigs," but he admitted that "the disease once started is easily communicated by contagion and infection." In a similar vein, Dr. C. M. Hines stated that the two causes of hog cholera were "continued close breeding" and "want of proper treatment,

which includes food, quarters, and general management . . . Contagion cannot cause it, but may aid in spreading it."

Prior to 1870 nearly all of the graduate veterinarians in the United States were from European schools, principally those of Great Britain. A prominent characteristic of the training at the London school in particular was the poorly developed concept of contagion, a virtual denial of which was taught as gospel by the surgeon, Edward Coleman, during his tenure of nearly 50 years as professor. Nor was the situation improved much under a series of his successors, beginning upon his death in 1839, and extending to about 1870. That this had repercussions in America may be appreciated from the statement of James Law in 1879 concerning the problem of stamping out hog cholera: "The great difficulty of putting into practice the means necessary to the extirpation of the disease will be found to consist in the lack of veterinary experts . . . This state of things is the natural result of a persistent neglect of veterinary sanitary science and medicine as a factor in the national well-being, and must for a time prove a heavy incubus on all concerted efforts to restrict and stamp out our animal plagues."

Fortunately, the work on animal plagues conducted by the Department of Agriculture at this time, and later by the Bureau of Animal Industry, was in the hands of the best qualified veterinarians in the country. To 1880, the principal investigators of hog cholera were Drs. D. E. Salmon, a Cornell graduate and first head of the Bureau of Animal Industry; James Law, professor of veterinary science and later first dean of the Cornell school; and H. J. Detmers, a graduate of Berlin. While their earlier writings demonstrate some indecision as to the nature of the disease they were investigating, it is evident that the three had recognized its contagiousness at a time when medical investigators for the Department were in strong disagreement.

In the USDA Report for 1875, James Law stated that hog cholera is "a specific, contagious fever of swine . . . Unwholesome conditions of life contribute largely to its diffusion . . . but it is too much to assume that the poison is developed *de novo* in such conditions." But later in this same report he concedes that "a certain number of cases probably originate spontaneously every year; but these are few and far between as compared with the enormous mortality caused by contagion." In 1879, however, he unequivocally stated that "unwholesome conditions of feeding and management . . . may be recognized as accessories . . . [but] we must not allow them to withdraw our attention from the one condition essential to the development and propagation of the malady—the presence of the specific poison."

Detmers, in the Report for 1877, although he would not deny the possibility of contagion, felt that "the epizootic character of the fearful spreading of the disease can be satisfactorily explained without the existence of a contagion," preferring to blame poor feeding and infection with entozoa. In 1879, he stated that the disease "is communicated from one animal to another by direct and indirect infection." Although he admitted that his own experiments had not absolutely ruled out the possibility of spontaneous generation, he had "scarcely any doubt" that his conclusions were correct. Factors of management "cannot constitute the cause and cannot produce a solitary case of swine plague, unless the infectious principles are present." It should be remembered that in this Report for 1879, a number of presumably competent medical investigators claimed without equivocation that the disease was not contagious.

Dr. D. E. Salmon has been characterized as the greatest veterinarian this country has produced. And to his credit, it appears that he never doubted the contagious nature of hog cholera, although, of course, he had the advantage of not having committed himself publicly until 1879. In this year he stated: "We cannot escape the conclusions that this disease is a contagious fever . . . the disease does not originate *de novo*." Later, in reporting on "two distinct swine plagues," about 1887, Salmon came as close to identifying the true nature of the hog cholera-swine plague problem as anyone could have until the incrimination of the filtrable virus.

It is apparent that Law was not the scientist that either Salmon or Detmers was, and the latter two did eventually fall into disagreement over the identity of the infectious agent. But the important point is that the three, through their independent investigations—Law in New York, Detmers in Illinois, and Salmon in North Carolina — came to the same conclusion concerning the contagiousness of hog cholera. Thus, of the nine men appointed to investigate various outbreaks of the hog cholera in 1878, the three veterinary members of the commission identified the disease as a contagion. Of the six medical members of the commission,

(Continued on page 409)

EDITORIAL COMMENTS

A.V.L. Public Relations Program Now Includes Television Media

Television stations, nationally, are making good use of the series of illustrated broadcasts on animal health problems now being furnished by Associated Veterinary Laboratories, according to results of a survey recently completed.

The program material, in both script and pictures, takes up a different animal health problem in each broadcast, and stresses the importance of veterinary service in coping with the problem discussed. The actual scripts are prepared by American Foundation for Animal Health, educational agency of Associated Veterinary Laboratories.

Survey questionnaires were sent to editors of 143 television stations across the country. Eighty percent reported the photo-script material useful in planning and presenting their programs. Approximately the same percentage said that they found the subject matter of the programs either "excellent" or "good."

The series of TV programs was launched last year on a test basis as a continued effort toward improved public relations. As a result of favorable response, Associated Veterinary Laboratories have announced that a new series is going forward in 1957, including discussions of such subjects as mastitis, rabies, saving baby calves, encephalomyelitis, cattle and sheep bloat, blackleg, protecting health of livestock at fairs, leptospirosis, hydrocyanic acid poisoning, shipping fever, hardware disease, and ectoparasites.

In addition, member companies of Associated Veterinary Laboratories have announced that they are also continuing to underwrite public relations efforts through newspapers, farm magazines, radio, and other media.

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American Association of Veterinary Nutritionists

The American Association of Veterinary Nutritionists became an active organization with the adoption of a constitution and election of officers by an interested group of veterinarians attending the 93rd annual meeting of the American Veterinary Medical Association, San Antonio, Tex., Oct. 15-18, 1956.

The objectives as set forth in the constitution of this organization are:

1. To provide a concerted means for discussion and exchange of information on matters of common interest as applied to the field of nutrition in its relationship to animal health.

2. To promote greater veterinary interest in and better understanding of current developments in nutrition as affecting animal health.

3. To promote research in fields where nutrition may have a relationship to disease.

4. To promote closer cooperative relationships with those who share with veterinarians the responsibility of maintaining optimum animal health through adequate nutrition.

These objectives clearly reflect the need, the sphere of interest and projected activities of this group. The profession has always had a vital interest in animal nutrition. However, with the more rapid advance in nutrition research and the growing trend toward mass medication, the current and future responsibilities of the veterinarian in this specialized field are inescapable. Animal health extends far beyond the sphere of diagnosis and treatment of disease outbreaks. It includes adequate nutrition for the maintenance of normal health and prevention of disease. Included in this is low level medication.

Any member of the A.V.M.A. is eligible and welcome to join this newly formed special interest group. Application should be addressed to Dr. R. E. Lubbehusen, Membership Committee, 69 Berry Road Park, Glendale 19, Mo.

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Too Few Meat Inspectors

International News Service report for April 22 quotes officials of the Meat Cutters Union that the Federal Meat Inspection Service is so understaffed as to cause serious curtailment of meat processing operations. Inadequate staffing of inspection services conceivably might result in "dangerous consequences" from a public health standpoint. Possible shortage of supply of available meats due to inadequate inspection provisions, and unfavorable influence on livestock markets, and employment of packing house workers were cited in communication to Congress urging sufficient appropriation for inspection service.

The Study of Veterinary History

A. BARTON, D.V.M., Forest Hills, New York

Veterinary education in America is on the threshold of a new discipline — the study of veterinary history. Since Smithcors inaugurated a course in the history of veterinary medicine at Michigan State University in 1954, Eby has followed through with a similar course at the State College of Washington. Veterinary journals are encouraging the study by accepting articles on the subject with increasing frequency. My own long dormant manuscript of Leclainche's, *Histoire de la Médecine vétérinaire,* has been circulating in various colleges in order to stimulate a concrete awareness of the subject. With the publication of Professor Smithcors' book on the Evolution of the Veterinary Art, an added impetus will be given to incorporate the study of veterinary history into the curriculums of other veterinary institutions. It is safe to predict that within a short time veterinary history will be a routine subject in the veterinary curriculum. It is proper at this point, therefore, to state, as a matter of general policy, the pathway the study of veterinary history should take and what its ultimate accomplishments are intended to be.

It is first necessary to gain knowledge of veterinary historical facts and to have them made generally known. Now that Smithcors' Evolution of the Veterinary Art has appeared, the essential facts are readily available in convenient form. When the facts of veterinary history are thoroughly mastered, historical tastes will become more sophisticated and the study of veterinary history will become more subtle. This has already taken place in the study of the history of medicine and it will no doubt occur as the study of veterinary history develops.

For historical facts, whether they are of veterinary history or the history of anything else, are not of crucial importance. What is of crucial importance is the interpretation of those facts. In order to interpret historical facts adequately, they must be considered within the context of the whole panorama of the time. Therefore integration with the philosophy, religion, politics, economics, art — in a word, with the whole stream of human endeavor — is necessary. That is one of the reasons why history is repeatedly rewritten. It is rewritten not because the historical facts have changed, but because they are viewed from a different vantage point in the time-space dimension. An example of this concept can be seen in the influence of the doctrine of evolution on the study of history. Darwin and his successors opened the stream of history to evolution as a developmental process in which society evolved from lower to higher forms of organization, and erased for all time the study of history as a sequence of chance occurrences. Thus the study of veterinary history is not the study of mere veterinary historical fact, but the integration of veterinary historical fact into the stream of history in the light of new knowledge.

Veterinary history is, therefore, more than the record of material achievements of the past. For if it concerned itself only with material achievements, it would be fair to suggest that we should accept from the past only that which is useful to us and to relegate the rest to the rubbish heap. The material achievements of the past are, after all, dead and gone, crumbled to dust. The study of these things would be dead history, and if we can not have live history, it would be better to leave it alone. To have a living history, we have to study those things in history that are still alive for us. And what is still alive for us — that which has persisted throughout time — can not be found through re-evaluation of past material achievements, but in the ideas, the aspirations and the ideals of the past that march on before us independent of the contingencies of changing times. What we want to study, therefore, in veterinary history are the living forces that made us what we are today. The subject matter should concern the ideas, aspirations and ideals that were involved in the struggles to determine the fundamental truths that serve as the foundation stones of contemporary veterinary medicine. When veterinary history is approached from this point of view, it becomes a truly living history in which past, present, and future become indissolubly blended together, so that there is no past, no future, only an everlasting present.

What do we intend ultimately to accomplish by this approach to veterinary history? This approach to veterinary history will have a broadening, liberalizing, and humanizing influence on the veterinary curriculum that will tend to produce a superior type of professional man; one who will not be hide bound by narrow professional specialization. Such a superior professional person can not fail to stimulate greater confidence among the general public and also command fuller respect from fellow scientists in the learned professions.

The task of the study of veterinary history set forth here may appear to be an overwhelming one, but we should not be discouraged. Mere gratitude alone should induce in us the desire to study the efforts of our predecessors. George Sarton, who was the greatest historian of science of them all, and whose ideas are incorporated into the present essay, has said that, in any case, some of us must needs accept the challenge. We have to dedicate ourselves to our study in the same way that medieval craftsmen dedicated themselves, body and soul, to their art.

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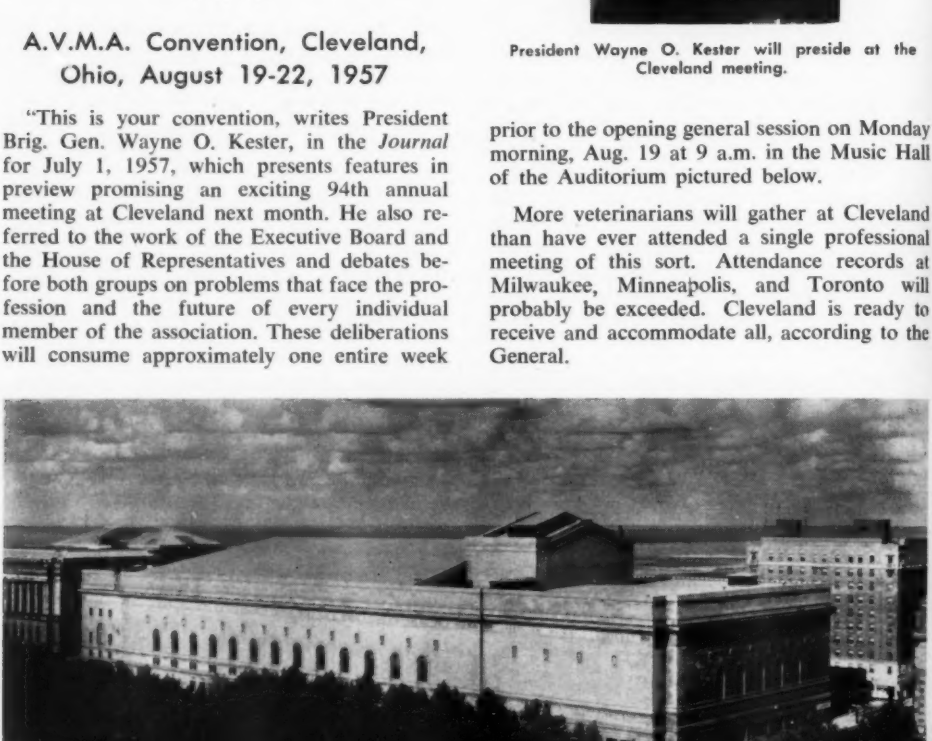
A.V.M.A. Convention, Cleveland, Ohio, August 19-22, 1957

"This is your convention, writes President Brig. Gen. Wayne O. Kester, in the *Journal* for July 1, 1957, which presents features in preview promising an exciting 94th annual meeting at Cleveland next month. He also referred to the work of the Executive Board and the House of Representatives and debates before both groups on problems that face the profession and the future of every individual member of the association. These deliberations will consume approximately one entire week prior to the opening general session on Monday morning, Aug. 19 at 9 a.m. in the Music Hall of the Auditorium pictured below.

President Wayne O. Kester will preside at the Cleveland meeting.

More veterinarians will gather at Cleveland than have ever attended a single professional meeting of this sort. Attendance records at Milwaukee, Minneapolis, and Toronto will probably be exceeded. Cleveland is ready to receive and accommodate all, according to the General.



Cleveland Public Auditorium and the Mall located in the heart of the downtown area. It has air-conditioned rooms for meetings of 10,000 and 3,000 persons, plus many other smaller meeting rooms. It has more than a quarter of a million square feet exhibit space in its underground area and is one of the most popular convention halls in the nation.

Committee on Local Arrangements

Hotel and meeting room facilities are convenient, modern, and efficient. Air conditioning is promised if needed but the summer climate of the lake-shore city is ordinarily pleasant.

Preceeding important conferences that will begin as sectional meetings on Monday afternoon, of which there are six, an all-day conference on Professional and Public Relations will convene at 9:30 a.m. in the Ballroom of the Hotel Cleveland. Interested veterinarians are invited to attend this session which has been a continuing study for the past several years toward developments of acceptible methods and means for improved relations with allied professional groups and the public. Closing session and installation of the new president (now President-Elect W. W. Armistead) will convene at noon Thursday, August 22.

Entertainment—Plans for Children

A variety of entertainment has been arranged as the Women's Social Program, highlighted by the President's Reception and Dinner on Wednesday evening in the Main Arena of the Auditorium. In addition, three separate programs for children (teenagers-Subteenagers [8-12] and Youngsters [3-7]) have been arranged and will be supervised by committees of wives of local veterinarians. Splash and coke parties, boat trips, and tours are certain to interest all members of the family. For the veterinarians, a golf tournament on Monday afternoon, a selection of big league baseball (American League Cleveland Indians *vs.* Boston Red Sox) or musicarnival on Tuesday evening, and Alumni Dinners and President's Reception on Wednesday evening will furnish a full schedule.

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The History of Some Current Problems In Animal Diseases: VI. Hog Cholera

(Continued from page 405)

three affirmed and three denied the contagious nature of the infection. This, of course, is not meant to be a derogation upon the medical profession, for the germ theory of disease was still in its infancy. Rather, it is a tribute to the veterinary profession that, with all too few of Law's "experts," the three veterinarians chosen for the task should have been able to find the truth in a bewildering mass of consequential and inconsequential data.

School of Veterinary Medicine — Purdue University, Lafayette, Indiana

Establishment of a School of Veterinary Science and Medicine has been approved by the Purdue University board of trustees following authorization by the Indiana legislature.

The new school — the 18th in the United States — will offer work leading to degree of Doctor of Veterinary Medicine (D.V.M.).

Dr. L. M. Hutchings, head of the Purdue Department of Veterinary Science, has been named dean of the new school. He and his staff are making plans for the curriculum and new buildings that will be needed.

The school will be organized, equipped and staffed to admit and instruct not more than 50 students in each entering class. If facilities and finances permit a small class will be enrolled in the fall of 1958; otherwise classes will not start until the autumn of 1959.

Veterinary medicine at Purdue will consist of a six-year program divided into two parts.

A two-year preveterinary program has been and will continue to be taught in the School of Agriculture. This preveterinary curriculum compares with premedical requirements with some agricultural courses added.

The second part of the program is a professional school curriculum of four years and is the newly authorized area of study. All basic requirements of the American Veterinary Medical Association will be met for professional accreditation of the school.

New buildings for the school will be constructed east and south of the Purdue campus. Hospital and clinical facilities with an ambulatory clinic will be provided for large and small animals. Research programs in animal diseases and animal pathology long recognized as among the best in the nation, will be continued to attract a strong graduate student enrollment. Research, extension and public services of the Department will continue under the director of agriculture.

The school will round out a program started at Purdue in 1887. At that time the Veterinary Science Department was established to "prevent the enormous losses from animal disease." It was one of the first agricultural departments to be organized at the University.

Doctor Hutchings joined the staff of Purdue in 1942, was promoted to professor in 1947 and became Department head in 1950.

He earned a B.S.A. degree from the Univer-

(Continued on page 414)

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.

Manhattan, Kansas

Immunity to Tetanus

Understanding of the use of tetanus toxoid and tetanus antitoxin to those who have not followed developments in this field, is at times confusing. Some of the salient points are: (1) Tetanus toxoid produces active immunity — usually by two preliminary injections about a month apart, and a "booster" injected a year later. Its action is independent of any antitoxin that may have been used. (2) Tetanus antitoxin produces a passive immunity of short duration. Therefore, if a permanent immunity is desired the toxoid should be used following the use of antitoxin. Certainly the patient with a tetanus prone wound should at once receive antitoxin, and then at a different site, and separately, the toxoid.

Also because the toxoid though highly effective in producing permanent immunity, it is still advisable immediately following the occurrence of a tetanus prone wound to give antitoxin. Since the antitoxin is mostly equine origin, foreign serum desensitization is not of great importance in animals though when a horse serum is used, other species occasionally require desensitization. Finally, it is well to remember that recovery from an attact of tetanus does not result in permanent immunity and in the case of valuable animals, a full course of toxoid treatment is recommended. General treatment is still advisable.

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Action of Tetanus Toxin

Formerly the concept of the action of tetanus toxin was that it was elaborated in the wound and it reached the central nervous system by way of the regional nerve trunks. This view was challenged by some who maintained that the toxin acted peripherally in the region of the motor end plates and then distributed by the blood stream to the anterior horn cells. However, as late as 1956 it was demonstrated that the primary site of the toxin is the central nervous system, and that this region is reached by following nerve trunks, although passage by the blood stream is not entirely excluded.

Mycotic Abortion

A report Mycotic Abortion by Austwick and Venn appearing in the May 4, 1957, issue of *The Veterinary Record* is that there is ample evidence that some fungi do cause abortion in cattle, although the condition does not lend itself to routine methods of diagnosis. Most of the cases critically examined disclosed *Aspergillus fumigatus* as the contaminant, although three other fungi were isolated. The authors finally concluded that the "frequency of the condition in relation to other known causes of abortion suggests that it is of considerable economic importance."

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Rotenone Poisoning in Swine

Rotenone, usually prepared as powdered derris root is used extensively, mostly by ranchers and farmers, as an insecticide in the control of ox warble. The agent is poisonous when taken in sufficient amounts by way of the digestive tract in "single-stomached" animals such as swine. Drs. Oliver and Roe of the Ontario Veterinary College report that some accidentally spilled rotenone swept into a feed bin, and the feed so contaminated consumed at a later period by swine resulted in the death of several of these animals. The diagnosis of rotenone poisoning was confirmed by colorimetric tests and quantitative analysis.

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Psittacosis — Ornithosis

The word "psittacosis" applies specifically to a virus disease of psittacine origin such as the parrot-like species, and because of their popularity, of parakeets in particular. The word "ornithosis" — this due to the same etiological virus as that of psittacosis — refers to the same disease when the virus is in birds other than psittacines, such as canaries, doves, chickens, et cetera. In human beings the diagnosis is usually "psittacosis" immaterial of the origin of the virus. Taken as a whole the distinction is one of academic interest without real practical significance.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Vaccines for Respiratory Diseases

Newcastle disease and infectious bronchitis vaccines are now available for application as a dust, mixing with drinking water, and for injection intranasally. All these methods have certain advantages as well as disadvantages, and individual situations should govern the selection of one type and technic over another. Regardless of the type selected for use there are a few precautions that are important to observe. First of all, vaccines should be purchased from reliable manufacturers. They should be stored at temperatures recommended by the manufacture and used before the expiration date. It is poor practice to try to "stretch" the vaccine by trying to immunize more birds than the number stated on the package. An essential for successful results following use of live virus vaccines is keeping the birds comfortable after vaccination. For brooding chicks this may require increasing the brooder temperature. A second vaccination of chicks in four to five weeks may be recommended to overcome parental immunity in some chicks which prevents their building immunity following the initial dose.

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A summary of the state egg laws and regulations has been published by the Agricultural Marketing Service (AMS) in Agriculture Handbook 112. It summarizes, among other items, the shell egg grading programs by states; size and weight specifications; requirement by states for licenses, certificates or permits for egg dealers; and sources of data pertinent to state laws and regulations.

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Houses and Equipment for Laying Hens is the title of USDA Miscellaneous Publication 728. It is exactly what the title indicates, a report on methods of housing, effects of flock size on housing, and details on types of houses and equipment to meet most conditions. It is well illustrated and contains a number of detailed drawings.

Herbicide not Toxic to Poultry

The herbicide 2-4-5-T in common use for brush and weed control has been tested at Purdue University for toxicity for turkeys and found nontoxic. These studies were conducted by R. E. Roberts of the Purdue poultry staff and B. J. Rogers of the Botany Department. They placed turkey males weighing about 15 lb. in pens on an alfalfa and blue grass pasture which had been sprayed with 2-4-5-T at the rate of 1.6 lb. per acre, the usual amount used for weed control. No harmful effects on the turkeys were observed. Later other and more drastic treatments also proved the chemical to be nontoxic. (*The Poultryman*, 26:4, March 29, 1957).

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Erysipelas of Turkeys

Oregon State Agricultural Extension bulletin 756 entitled, Erysipelas of Turkeys, has been published recently. The same bulletin is distributed by Washington State Extension Service as Extension Bulletin 509. It is a semipopular discussion of this disease, giving symptoms, autopsy findings, and methods of prevention and control. It is well illustrated. It describes vaccination procedures, and recommends penicillin as a safe effective flock treatment if given at the onset of disease.

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Another possible cause of a mysterious hemorrahagic syndrome in turkeys is a substance called BAPN (beta amino-propionitrite) according to a recent report from the Department of Poultry Husbandry, University of Wisconsin. This substance found in the seeds of sweet peas can produce internal bleeding and death in turkeys fed at oral dosage levels of 0.12% in feed. Dosages as low as 0.04% in feed caused abnormalities and a 50% mortality in 26 days.

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The 1955 crop of turkeys totaled 65,570,000 which is 3 percent less than in 1954.

VETERINARY NUTRITION

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

Enzymes As Feed Additives

Much has been said in recent months regarding the trend toward the use of various additives in animal feeds. Antibiotics, hormones, and medicaments of many kinds have been used to improve feed utilization and production efficiency. More recently, scientists have shown a great deal of interest in the use of enzymes. They now join the long list of such materials being used as feed additives.

The role enzymes might play in nutrition created a stir in livestock circles last year when Catron reported that pepsin could be added to baby pig feeding programs to good advantage. He observed that the use of pepsin in a feed intended for pigs weaned before two weeks of age would permit the use of vegetable protein sources.

Until pigs are five weeks of age, they do not produce enough pepsin for utilization of vegetable proteins efficiently. Since milk proteins are relatively expensive, the Catron work pointed to some interesting economic possibilities.

A newer development in this field may be even more significant. Jensen and McGinnis of Washington State College reported that barley may be made equal to corn in feeding value by a kind of predigesting process. Actually, two treatments were used. Soaking the grain in water is one and added amylolytic enzymes the other.

The water treatment was most effective in improving the nutritive value of barley for feeding chicks. The energy content of this grain is about 72% that of corn. Following the water soaking, it proved to be fully equal to corn.

The water treatment consists of soaking the ground grain in an equal weight of water for eight hours. It is then dried at 70 C. in a forced air oven. This treatment appears to effect a similar improvement in feeding value of rye and wheat.

The beneficial effect of the water treatment of grains is thought to be due to an "unlocking" of some of the carbohydrates formerly inaccessible in the grain. There is also the thought that this treatment increases enzymatic activity.

Indeed, the addition of amylolytic enzymes to the grain accomplishes the same results. Commercial amylase products, like clarase, used at a level of 0.5 gm. per lb. of feed improved the feed utilization of barley in poultry feeding trials.

Worthy of further experimentation is to learn the effect of the enzyme on other grain products. It would also be of interest to know whether the same results could be had in feeding these treated grains to other monogastric animals.

The economic importance of this work is immediately apparent. Improving the feeding value of barley in corn-deficient areas represents a primary dollar savings. These areas would no longer have to import corn for high energy feeds. A few pounds of enzyme added to a ton of the feed may be the answer.

Effect on Scours

One of the observations made by the Washington workers related to the condition of the droppings. Birds on water treated grain had less "sticky" droppings. Moreover, the treatment appeared to lower the water content of droppings.

Veterinary practitioners who remember the "soaked oats" treatment for pigs scours may smile. This empirical treatment which was effectively used for years may have been the forerunner of this Washington work. This treatment was thought to work because the soaked oats represented added bulk. Could it be, though, that soaking the oats made more carbohydrates available while increased enzymatic activity enabled the sick pig to get more energy from the oats? Somehow, practices which have been tried and proved in the field eventually find themselves a sound scientific explanation. This may be the case here.

Additional Work

A number of experiment stations are working in this field now. Cunningham and Bris-

(Continued on page 414)

THE PRACTITIONER'S LABORATORY

WILLIAM L. SIPPEL, B.S., V.M.D., M.S., Ph.D.
Kissimmee, Florida

Laboratory Diagnosis of of "Hardware Disease"

The practitioner is usually able to diagnose traumatic pericarditis or gastritis ("hardware disease") from symptoms, however some cases are obscure or for other reasons laboratory confirmation is desired.

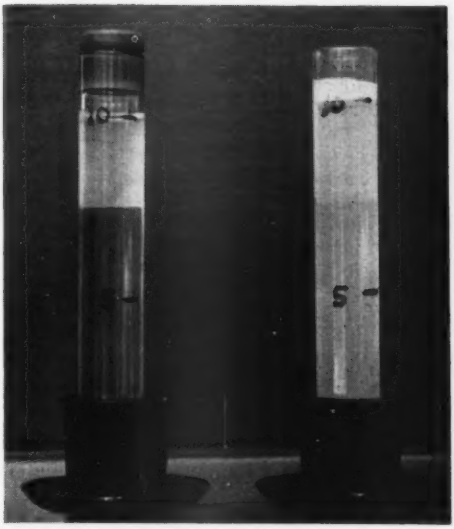
Blood Counts

Good confirmatory laboratory methods are the total white blood cell count and the differential white blood cell count. The total white blood cell count will usually be high, in the neighborhood of 14,000 to 30,000 cells per cc. of blood, as compared with a normal of 7,000 to 9,000. Differential white blood cell count will reveal an increase in the number of neutrophils, usually with an increase in the number of immature neutrophils, Schillings so-called "shift to the left." Neutrophils may increase from a normal of 25-35% to 50-90%. Repeated counts at 12-24 hour intervals are more valuable than single examinations. Both the total white blood cell count and differential count should be used on each patient for best results. It is not unusual to find the total white blood cell count within the normal range in cases of "hardware disease." Blood smears made from fresh blood are superior to those made from blood to which an anticoagulant has been added.

The blood cell changes referred to above will of course be seen in most pyogenic and some other infections, and can not be considered specific for "hardware disease." These tests are merely aids for confirming a clinical impression.

Metal Detectors

The so-called metal or mine detectors have been advocated as diagnostic aids for penetrating metallic foreign bodies. Due to the frequency of bits of metal which apparently do no harm but that are detectable with this instrument, negative examinations are probably more significant than positive ones. However, the correlation of a positive metal detector examination with symptoms of "hardware disease" is another bit of evidence strengthening diagnosis.



Sulkowitch test for urinary calcium: (l.) Clear-negative test, (r.) turbid-positive (normal).

Sulkowitch Test

Reports[1,2] from this country and abroad[3] have indicated that the Sulkowitch test can be used to advantage in confirming diagnosis of penetrating foreign bodies. In 1951, Silver[1] reported this test for urinary calcium to be negative in 75% of 23 cases of traumatic gastritis which were confirmed by surgery or slaughter.

In a recent conversation, Doctor Silver indicated that he is still using the technic and is well pleased with it. He indicated that some of his colleagues were using the test and also found it helpful in confirming diagnosis.

Bragg[2] reported the test to be useful, but recently warned (personal conversation) that he thought anything causing atony of the rumen also resulted in a negative test for urinary calcium. He felt, however, that the test helped him decide whether to operate or not when other clinical signs of the condition were present.

In England[3] six of Hall's cases confirmed by operation or autopsy were negative to the urinary calcium test.

The test is easy to perform and can be done rapidly on the farm.

Materials. 1. Test tubes (Bangs type) marked at 5 ml. and 10 ml. graduations. 2. Sulkowitch reagent.*

Oxalic acid	2.5 gm.
Ammonium oxalate	2.5 gm.
Glacial acetic acid	5.0 ml.
Water q. s.	150.0 ml.

Method. 1. 5 ml. of urine is collected in the test tube. 2. 5 ml. of Sulkowitch reagent is added. 3. The tubes are examined for turbidity at two and ten minutes.

Interpretation. In cases where the urine contains calcium, as it normally does, a turbidity will develop (positive test). In most cases of hardware disease the urine will contain no calcium and the fluid will remain clear (fig. 1) giving a negative test.

An explanation of why the urine lacks calcium during these infections resulting from penetrating foreign bodies is lacking.

Precautions. The Sulkowitch test was recommended at one time as an aid for the diagnosis of postpartum paresis, but was later shown not to be sufficiently reliable. Detweiler and Martin[4] found 20% of ten normal cows to give a negative Sulkowitch test whereas Roberts *et al.*[5] found 35.7% of 28 normal cows to be negative to the test. Hall[3] found all of "over 50" normal cows to give positive tests with the exception of one cow recently calved. The report of the latter authors indicates that the urinary calcium level varies greatly during the day in a given individual. In human medicine, 24-hour urine samples are used for the test.

In checking the effect of other diseases on the test, Detweiler and Martin found the urine of cows with the following diseases to be positive for calcium: Nephrosis, acute mastitis with septicemia, rickets, osteoporosis (two cases), metritis, (four cases) of actinomycosis (undergoing *x*-ray therapy), and acetonemia.

The favorable reports on the use of this test by Silver, Bragg, Hall and others, recommends it as a worthwhile adjunct for the practitioner. However, the test should not be relied upon solely for the diagnosis for as Detweiler and Martin wrote when speaking of its use for diagnosing postpartum paresis, "It is needless to point out that, like other tests of this nature, it only has value when correlated with careful clinical observations."

*Available from Pitman-Moore Co., Indianapolis, Ind., as Caltest.

REFERENCES

1. Silver, Jules., The Sulkowitch Test in Traumatic Gastritis. *N. Am. Vet.*, 32:829, 1951.
2. Bragg, Taylor A., Digestive Disturbances in Cattle. *Vet. Med.*, 51:159, 1956.
3. Hall, Sherwin A., Diagnosis of Reticulitis. *Vet. Rec.*, 68:88, 1956.
4. Detweiler, D. K., and Martin, J. E., The Sulkowitch Test as a Guide in the Diagnosis and Therapy of Bovine Hypocalcemia. *Am. Jour. Vet. Res.*, 10:201, 1949.
5. Roberts, S. J., Rickard, Chas. G., and Bentinck-Smith, J., A Clinical and Laboratory Evaluation of the Sulkowitch Test as a Diagnostic Aid in Bovine Hypocalcemia. *Jour. Am. Vet. Med. Assn.*, 119:380, 1951.

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School of Veterinary Medicine

(Continued from page 409)

sity of Maine, M.S. and D.V.M. degrees from Michigan State University and the Ph.D. from Purdue. His special field of research is brucellosis in domestic animals.

In 1947, Doctor Hutchings was chosen the outstanding young man in Indiana by the Junior Chamber of Commerce and won the Sigma Xi research award.

He is a member of national research councils on animal health, brucellosis and leptospirosis in man and animals. He is on the Executive Board of the American Veterinary Medical Association, a member of the Committee of the U. S. Livestock Sanitary Association for Eradication of Hog Cholera, and of the World Health Expert Panel on Brucellosis.

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Veterinary Nutrition

(Continued from page 412)

son of the Canadian Department of Agriculture reported in the May 1957 issue of the *Journal of Animal Science* on some investigational work. They were interested in the effect of amylases on the digestibility of starch by baby pigs. This study too was prompted by economic considerations. Starch, which the baby pig does not utilize efficiently, is far less expensive than lactose which it does. It was hoped that amylase would permit the feeding of starch.

It is surprising to note that while the starch was almost 100% digested, pigs did not thrive. In this study, pancreatic and malt amylases appeared to have no effect on growth rate. It is also quite evident that not all questions on the best way to use enzymes in practical livestock feeding are answered. There seems to be no doubt though that this is one of the new frontiers in nutrition. We might soon be checking feed tags for their amylase, protease, and lipase content.

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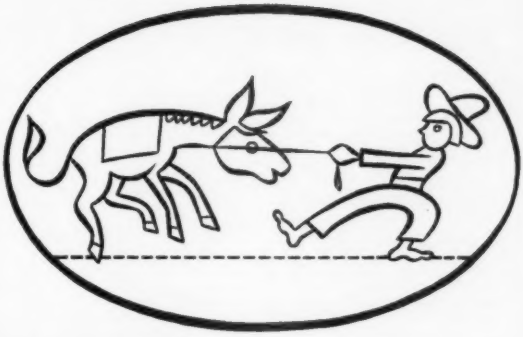
STUBBORN
SKIN CONDITIONS



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More and more emphasis is given for a weighing program in livestock operations to accurately estimate efficiency of management and feeding practices. This applies to all types of domestic livestock.

Detailed information regarding the new combination chute and scales is available on request. Address — Heldenbrand & Son Mfg. Co., P. O. Box 2367-A, Oklahoma City, Okla.

▼ ▼ ▼

Dr. A. L. Sundberg, Mount Vernon, Ia., has been appointed acting state veterinarian to succeed the late Dr. H. V. Garrett. Doctor Sundberg graduated from Iowa State College, Ames, in 1931. He practiced at Laurens until 1956 when he accepted an appointment as district veterinarian.

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Dr. Samuel F. Scheidy, assistant professor of clinical veterinary medicine at the University of Pennsylvania and formerly associated with Merck, Sharp & Dohme has accepted the position of veterinary medical director for S.K.F.

▼ ▼ ▼

The state of Arkansas has banned the use and sale of unattenuated hog cholera virus, according to advise from Dr. J. S. Campbell, state veterinarian. Penalties for violating any of the provisions of this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not less than $25., nor more than $500.

Provisions of this Act became effective July 1, 1957.

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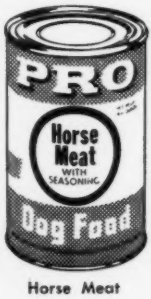

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Methylandrostenediol is a *non-gonadic* hormone with excellent anabolic and protein sparing action. The effects of this single hormone are in many respects similar to combined testosterone-estrogen therapy but with the added advantage of being non-toxic in overdose and with practically no effect on the secondary sex characteristics.

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The vital functions which vitamin B_{12} performs in the aged has been dramatically shown by a number of studies. Deficiency symptoms of this vitamin occur with greater frequency in older dogs than in young adults.

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Each enteric coated tablet containing:

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Combined estrogen-androgen therapy has been widely and successfully used by physicians in the management of geriatric problems such as osteoporosis, muscular atrophy, and general senile debility.

Endozime tablets also contain thyroid to increase basal metabolism and stimulate the animals own endocrine system to renewed activity, digestive enzymes to aid in the digestion and absorption of other essential nutrients, and methionine to improve the biological value of the protein contained in the dog's regular diet thereby reducing the "waste nitrogen" load on aging kidneys. Also included are the fat soluble vitamins, two of the water soluble vitamins most helpful in geriatrics and minerals needed for proper metabolism and electrolyte balance.

INDICATIONS: Wherever advanced age may contribute to reduced kidney function, urinary incontinence, posterior weakness, poor appetite, listlessness, reduced libido, shyness, obesity, muscular atrophy, surgical risk, nonspecific dermatitis, general senile debility or osteoporosis.

DOSAGE: One cc. of the injectable product for each 25 pounds body weight, followed by one Endozime Tablet per day. Additional injections may be given one to three times monthly as indicated.

In many cases stimulating effect may be obtained by interrupting tablet medication for one week out of each month. Animals showing advanced senile debility usually do best on continuous medication.

Endozime Injectable is supplied in 10 cc. sterile vials. Price per vial $3.75.

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DOSAGE: For dogs, (acute and severe cases): 0.5 to 1 cc. (depending on size) intramuscularly B.I.D. Light to moderate cases: 0.5 cc. one to three times weekly.

SUPPLIED: Sterile 10 cc. vials. Price per vial $2.75.

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An aid to the correction of liver damage resulting from infectious hepatitis, toxic hepatitis, cirrhosis, fatty liver degeneration, diabetes, or nutritional deficiencies of protein, certain vitamins, or lipotropic agents.

DESCRIPTION: An injectable combination of lipotropic factors, containing in each cc.:

Choline chloride	100 mg.
Inositol	50 mg.
dl-Methionine	25 mg.
Vitamin B_{12}	3 mcg.

References indicating therapeutic value of Hepatropin supplied on request.

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The injectable antihistamine of choice in a convenient potency for dogs and other small animals (by intramuscular injection).

DESCRIPTION: A sterile injectable solution containing 10 mg. of Methapyrilene hydrochloride per cc., relative non-toxic antihistamine having low sedation properties.

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DOSAGE: As emergency treatment for anaphylactic shock or severe drug sensitivity, 1 cc. per 10 lb. body weight. For mild or chronic allergies, 1 cc. per 25 lb. body weight at 12 to 48 hr. intervals as indicated.

SUPPLIED: Sterile 30 cc. vials. Price per vial $1.25.

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A continuing pathological condition should be suspected in any case of anemia that does not respond promptly to Hemoplexamine therapy.

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Liver Injection U.S.P. (100 mcg. B_{12} activity per cc.)	100 mg.
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Folic acid	1 mg.
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Calcium pantothenate	1.25 mg.
Niacinamide	50 mg.
dl-Methionine	5 mg.
1-Cysteine HC1	0.5 mg.
Procaine HC1	.2%
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Medical Frauds

Racketeers who pander to the superstitious elements of a panacea minded minority are grossing $50,000,000. annually through direct mail promotion of medical frauds, according to Postmaster General Arthur E. Summerfield. Not only do they defraud the hopelessly ill, such as cancer victims, they also demand and get fancy prices for fake remedies from the gullible sufferers of arthritis, baldness and skin conditions, ebbing virility, heavy weight, and flat busts. Even superstition pays its homage to science, however. Devices with atomic and electric features enjoy the best demand. No "sure cure" devices for animal diseases were reported.

Since most racketeers operate under cover of first class mail, they are not subject to postal inspection, and are therefore not easily apprehended or convicted.—*Science News Letter, June 1, 1957.*

▼ ▼ ▼

The addition of 1 oz. of corn oil per pig per day appeared to speed recovery of a group of pigs suffering a mild form of greasy pig disease. —*R. W. Hughes, D.V.M.*

It Has What it Takes For CHEMICAL DISINFECTION OF SHARP SURGICAL INSTRUMENTS

You can rely on
B-P FORMALDEHYDE GERMICIDE to...
contains HEXACHLOROPHENE (G-11*)

KILL vegetative pathogens and spore formers within 5 minutes.*
KILL the spores themselves within 3 hours.*
KILL tubercle bacilli within 5 minutes.*

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Used as directed, it will not injure keen cutting edges, points of hypodermic and suture needles, scissors and other 'sharps' . . . nor rust, corrode or otherwise damage metallic instruments.
IT'S THE ECONOMICAL ANSWER towards keeping annual costs for solutions and instrument replacement and repairs at a minimum. May be used repeatedly if kept undiluted and free of foreign matter.

Comparative chart sent on request

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Modified Live Virus—Chick Embryo Origin

Made with a true modified rabies virus cultivated in chick embryos, this vaccine is absolutely incapable of producing disease. At the same time, it produces high-degree immunity which has lasted in field tests beyond 3 years!

With the exclusive RECONSTIQUICK FEATURE for convenience! These vaccines reconstitute immediately upon introduction of the diluent, going into a fine homogenous suspension which will pass easily through a 24 gauge needle.

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A finely ground homogenous suspension of brain and spinal chord from sheep and goats previously inoculated with Fixed Rabies Virus, National Institute of Health Strain. The virus in this vaccine is chemically inactivated with Phenol. For administration in routine yearly vaccination of pets and or after exposure to the disease.

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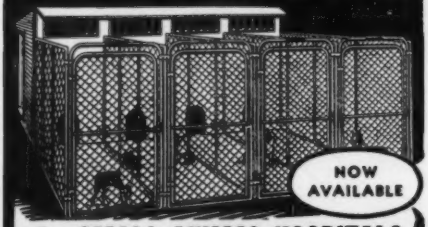

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Established in 1944, Borden agricultural scholarship awards have been extended to 358 seniors in 38 colleges in 35 states, according to the directory issued by Borden Company Foundation.

The Foundation has also awarded $300. prizes to 112 seniors in veterinary medicine at 10 colleges and universities.

▼ ▼ ▼

During fiscal year ending June 30, 1956, USDA inspectors examined more than 25,000 animals of all species for importation or exportation at air and ocean ports of the United States. Livestock shipments by air during the year were the heaviest in history as aircraft carried 63% of all United States livestock shipped overseas.

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Non-boilable, individual sealed glass tubes, 54" lengths.

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1cc. Tuberculin (Blue plunger)	$1.30 each, $14.40 Doz.
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20cc. Regular	$2.00 each, $21.60 Doz.

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3 ounce capacity with 3¼" nozzle and rubber bulb. Ideal for diffusing any powder over surfaces or into body openings and cavities, evenly and thoroughly. These Blowers are so inexpensive they are ideal to dispense with medication. Individually Boxed.

PRICE: .....75c each, $7.50 per Dozen

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Triocil is effective because

- it has a broad-spectrum action, against single or mixed infections, gram-negative and gram-positive bacteria;
- it has a strong affinity for tissue, resulting in a prolonged action;
- it remains active in the presence of pus or pus formers;
- no resistance to Triocil has developed in extensive clinical tests.

Administration: Triocil Ointment is applied directly to the affected area. It spreads easily, adheres well, does not stain. One application daily is usually sufficient, but treatment may be repeated if necessary.

Supply: Tubes of 20 and 50 grams, convenient for both hospital and office use and for dispensing.

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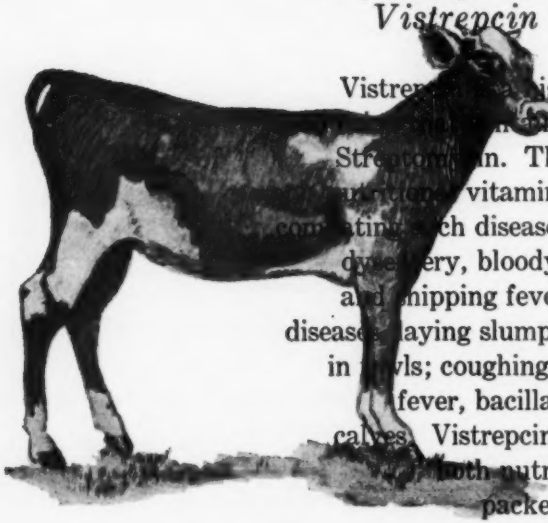
the simplest method

. . . for effectively fighting disease in poultry, calves, and swine is to add Vistrepcin to their drinking water.



Vistrepcin is a highly dispersible drinking water [illegible] which contains both Procaine Penicillin and Streptomycin. These two antibiotics along with [illegible] vitamins B_{12}, A and D_3 are helpful in combating such diseases as necro black scours, vibrio dysentery, bloody diarrhea, bacillary infections, and shipping fever in swine; chronic respiratory disease, laying slumps, blue comb and weight losses in fowls; coughing, calf scours, pleurisy, shipping fever, bacillary dysentery and bronchitis in calves. Vistrepcin, a fast-acting product used at both nutritional and treatment levels, is packed in 1 and 5 pound containers.

EACH POUND CONTAINS:

Procaine Penicillin G	[illegible]000,000 Units
Streptomycin Sulfate	[illegible].3.0 Gms.
Riboflavin	[illegible].400.0 mgs.
Calcium pantothenate	[illegible].600.0 mgs.
Niacin	[illegible].1400.0 mgs.
Vitamin B_{12} Activity	[illegible]000.0 mcgs.
Vitamin A (palmitate oil)	[illegible]U.S.P. Units
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- *improve appearance of coat*—give it a glossier, more natural look.

Sold to veterinarians only, SELEEN is supplied in 6-fl.oz., pint and economical gallon bottles. Order from your nearest Abbott branch, your distributor or Veterinary Division, Abbott Laboratories, North Chicago, Ill. Abbott

*Complete literature, with clinical data, available on request.

a new life for the old dog...

new metabolic regulator

restores muscle tone and vigor

Restoring hormonal balance in the aging dog often means increased vigor, better appetite, healthier skin and hair coat and, from all appearances, a "brighter outlook on life." Anabolin, the new metabolic regulator, helps do all this by providing a balanced combination of ethinyl estradiol, methyltestosterone and thyroid globulin.

The anabolic, protein-sparing effect of Anabolin helps overcome the effects of hormonal deficiencies or imbalances and strengthens the anabolic activities of the body. Anabolin is indicated in dogs of all ages to counter the catabolic effects of aging, injury, infection, faulty diet, surgery, parasitism.

Dosage: Usually one tablet daily. Larger dogs may require 2 tablets. Tablets are small and can easily be administered directly or in food. The beneficial effects of Anabolin usually become evident within 7 to 10 days but therapy should be continued as indicated.

Packaging: Bottles of 100 and 500.

Anabolin

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Monument to the Pig

The pig has been a citizen of what is now the United States for 417 years, according to the *National Livestock Producer*. He landed first in Florida on May 25, 1539, almost a century before the Pilgrims.

The American pig is a pioneer. He has helped us to win wars. He has helped pull us through periods of starvation. He has helped us "lift the mortgage." He is the second largest agricultural industry from the standpoint of the producer's income.

And yet, without a word of praise, he marches placidly off to the stockyards to become 20 varieties of meat, 50 medicines, and a couple of hundred industrial products.

Hernando de Soto died in Arkansas in 1542 — famed as the discoverer of the Mississippi river. But his real contribution to this nation was the introduction of the pig.—*from Farmer's Digest, Apr. 1957.*

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Mariculture designates a new concept for utilization of food resources of the sea employing technics proved successful in modern

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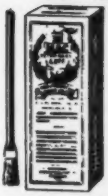

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Pfizer's New TURKEY FORMULA combines TERRAMYCIN and the essential vitamins in a concentrated, water-soluble, and palatable mixture. As little as one teaspoonful in two gallons of water, or the equivalent concentration in automatic water systems, will:

- *assure maximum fertility in breeding flocks*
- *extend the length of the normal laying cycle*
- *stimulate optimum growth and optimum egg production*
- *help maintain production and weight gains at times of stress*

TERRAMYCIN TURKEY FORMULA

For the prevention and control of blue comb (mud fever), infectious synovitis, and hexamitiasis.

To reduce mortality, especially in growing poults, and minimize losses in weight gains and egg production associated with infectious sinusitis.

Available in 1 lb. jars.

Increase the scope of your professional services to turkey growers in your practice area. Augment your dispensing volume. Stock and dispense TERRAMYCIN TURKEY FORMULA.

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And for chickens don't forget TERRAMYCIN EGG FORMULA

Department of Veterinary Medicine, PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.,* Brooklyn 6, N. Y.

Sympathy Powder

In an effort to conceptualize the mysteries confronting his very existence, primitive man was wont to find an etiology of occult force and therapeutic of magic rite. One of the countless thousands of superstitious remedies that have enjoyed widespread acceptance is the rite of annointing the weapon responsible for a wound, and not the wound itself. Certain African tribesmen elaborately polished the arrow that made the wound, thereby transfering prophylactic precautions to the wound itself. Similar superstitions, modified, were common in Italy, the Orient, and northern Europe as well.

Sir Kenelm Digby, a celebrated charlatan of 17th century England, applied a similar principle to his sympathy powder, a concoction manufactured with due reference to the Zodiac and exact ritual. Blagrave provides the following formula in his Astrological Practice of Physics:

> Roman vitriol ..... 6 or 8 oz.
> Grind in mortar, sift through fine sieve as sun enters Leo. Keep in heat of sun by day and dry by night.

Despite scathing ridicule from the medical profession of the day, the treatment consisting of application of the powder to the weapon responsible for a wound enjoyed widespread acceptance. Physicians experienced some difficulty in refuting the efficacy of this panacea since in most cases it worked better than bleeding and purging practices common to medical practice.

Sympathy powder continued to enjoy a brisk sale until an experimenter recorded equal success by simply closing wounds and neglecting the necessary application of sympathy powder to the responsible weapon. This proved to be as efficacious. However, sympathy powder did not go out with a bang, but with only a whimper.

▼ ▼ ▼

Tuberculosis Threat

In his discussion presented at the National Tuberculosis Association, Dr. James H. Steele, Chief, Veterinary Public Health, U. S. Public Health Service stated that the tuberculous livestockman or hired man is a bigger threat to healthy livestock than tuberculous cows formerly were to man.

Research Reveals Highly Effective Anthelmintic for Cattle

The results of recently intensive clinical research revealed an anthelmintic that is highly effective in cattle. Individual animals were confined in special stalls and administered different phenothiazine drench formulations for testing. All urinary and fecal excreta were recovered and each excretion was individually analyzed chemically to determine how much of the dose went into the digestive tract and amount of the dose available for killing worms. Dosages were given on an identical basis.

GREATER CONCENTRATION

Results obtained from this modified formulation were better than that of unmodified drenches generally used. Tests show that modified formulations produced on the average 6 to 8 times more phenothiazine in the digestive tract in a shorter period of time than other drenches. For example, peak percentages (above 1%) of the modified chemical were obtained in only 17 hours post treatment while the average of unmodified formulations returned a peak percentage of less than .2% 40 hours or later post treatment.

All statements regarding the effectiveness of the above tests are backed by documented experimental data.

Many veterinarians are using this modified formula under the professional label Pro-Brand Improved Cattle Wormer which is sold only to veterinarians. A brochure is available on request. For details write to Pro-Brand Products Company, P. O. Box 4186, Fort Worth, Texas.

no side effects from
THERAPOGEN
the proven effective germicidal agent
You'll find THERAPOGEN virtually free of side effects and toxicity. Its completely effective yet mild cleansing action has been found excellent for obstetrical work by veterinarians for many of the finest horse breeding farms in Kentucky. Inexpensive THERAPOGEN may be ideal for your needs, also.
Write, wire or call today for samples, literature and the name of your nearest distributor.
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proven results in these diseases of small animals

CANINE TRACHEOBRONCHITIS (KENNEL COUGH). In one study of 12 cases, FURADANTIN stopped the cough completely within 3 to 7 days.[1]

URINARY TRACT INFECTIONS. Extensively used in human genitourinary tract infections, FURADANTIN has also produced impressive clinical results in the treatment of bacterial nephritis and cystitis of dogs and cats.[2]

* * *

Preliminary data point to new indications for FURADANTIN. Various reports describe encouraging results with FURADANTIN in the treatment of vaginitis in the bitch and genitourinary tract infections of mares.[2] Another article concludes that FURADANTIN is an excellent adjunct to surgery in the treatment of prostatic abscess in the dog.[3]

Like all the nitrofurans, FURADANTIN is bactericidal to a wide range of both gram-negative and gram-positive organisms. It is nontoxic to kidneys, liver and blood-forming organs; and development of bacterial resistance is negligible.

Available as orange scored tablets of 10, 50 and 100 mg.; and Oral Suspension, bottle of 60 cc.

REFERENCES: 1. Mosier, J. E.: Vet. M. 50:605 (Nov.) 1955.
2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956.
3. Pollock, S.: J. Am. Vet. M. Ass. 129:274 (Sept.) 1956.

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NITROFURANS—A NEW CLASS OF ANTIMICROBIALS—NEITHER ANTIBIOTICS NOR SULFONAMIDES...PRODUCTS OF EATON RESEARCH

new specific treatment for calf scours

Developed specifically for the control of calf scours, new ENTEFUR provides rapid, effective and safe treatment. ENTEFUR drastically cuts mortality.[1,2] In one study, 60 of 63 ENTEFUR-treated calves survived, whereas in the control group only 3 of 24 calves lived.[2] "ENTEFUR treatment appeared the only factor modifying significantly the course and outcome of the disease."[2]

ENTEFUR contains the new nitrofuran, Furamazone® (brand of nifuraldezone) for rapid wide-spectrum bactericidal action against gram-positive and gram-negative enteric bacteria. ENTEFUR also contains bismuth subsalicylate for its mildly astringent, antidiarrheal action.

ENTEFUR BOLUS VETERINARY, small, contains: Furamazone 1 Gm., bismuth subsalicylate 0.26 Gm. Dosage: 1 bolus twice a day for 2 days. Supplied: Box of 24 (6 envelopes of 4 boluses each).

REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., in press.

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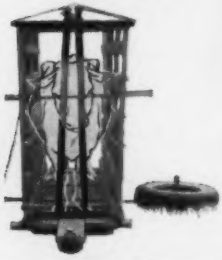

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Coloring is an integral part of Fibreplex manufacture, making them wear-resistant, stain-repelling, chemical-resistant and chip-proof. May be obtained in a variety of pleasing pastel shades.

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MEETING CALENDAR

Alabama Polytechnic Institute. Fiftieth Annual Conference for Veterinarians. Auburn, Ala., July 21-24, 1957. Dr. R. S. Sugg, dean.

Canadian Veterinary Medical Association. Ninth Annual Meeting. Hotel Georgia, Vancouver, B.C., July 22-24, 1957. Dr. J. Archibald, Ontario Veterinary College, Guelph, Ontario, vice-president.

Colorado Veterinary Medical Association. Fifty-second annual convention. Grand Junction, Colo., Aug. 9-10, 1957. Dr. Harold Hill, Colorado State University, Ft. Collins, Colo., president.

American Veterinary Medical Association. Annual meeting. Cleveland Auditorium, Cleveland, Ohio, Aug. 19-22, 1957. Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Washington State Veterinary Medical Association. Forty-second Annual Convention. Monticello Hotel, Longview, Wash., Sept. 9-10, 1957. Dr. William F. Harris, 1102 E. Main Street, Puyallup, Wash., secretary.

New York State Veterinary Medical Society. Annual Meeting. Hotel Statler, Buffalo, N. Y., Sept. 11-13, 1957. Joan S. Halat, 803 Varick St., Utica, N. Y., secretary.

South Dakota Veterinary Medical Association. Annual Meeting. Hotel Cataract, Sioux Falls, Sept. 19-20, 1957. Dr. J. L. Noordsy, Marion, S. Dak., secretary.

New England Veterinary Medical Association. Twenty-third Annual Meeting. Equinox House, Manchester, Vermont, Oct. 6-9, 1957. Dr. C. Lawrence Blakely, 180 Longwood Ave., Boston, Mass., secretary.

Florida State Veterinary Medical Association. Annual Meeting. Fort Harrison Hotel, Clearwater, Fla., Oct. 13-15, 1957. Dr. Robert P. Knowles, 2101 N. W. 25th Ave., Miami 42, Fla., secretary.

University of Missouri. Thirty-third Annual Short Course for graduate veterinarians. Columbia, Mo., Oct. 14-15, 1957. Dr. Cecil Elder, chairman.

Illinois Conference and Extension Short Course for Veterinarians. University of Illinois, College of Veterinary Medicine, Oct. 17-18, 1957. Dr. L. E. Boley, University of Illinois, chairman.

Eastern Iowa Veterinary Association. Forty-fourth Annual Meeting. Hotel Sheraton-Montrose, Cedar Rapids, Iowa, Oct. 17-18, 1957. Dr. F. E. Brutsman, Graer, Iowa, secretary.

Southern Veterinary Medical Association. Annual Meeting. Roanoke Hotel, Roanoke, Va., Oct. 27-30, 1957. Dr. A. A. Husman, P. O. Box 91, Raleigh, N. C., secretary.

▼ ▼ ▼

Dr. Wade O. Brinker, KSC '39, has been named head of the Department of Surgery and Medicine, College of Veterinary Medicine, Michigan State University, East Lansing, effective July 1, 1957.

Doctor Brinker succeeds Dr. Edward K. Sales who has retired.

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more convenient! lower cost! effective!

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Just *one* instrument, Pfizer's Automatic Implant Gun is all that is needed to implant the recommended 24 to 36 mg. dose of stilbestrol (two to three pellets). No nicking of the skin, no handling of extra instruments. A quick swab of the ear, easy insertion of the surgically sharpened needle under the skin, effortless pressure on the trigger and the animal is ready to be released. Special clips of pellets to allow treatment of three to five animals without reloading.

A time saver in practice . . . indispensable for dispensing!

STIMPLANTS: The recommended dose of 24 mg. (two pellets) for range animals and 36 mg. (three pellets) for feedlot cattle will stimulate:

- maximum daily weight gains with
- less feed consumption per unit gain at
- minimum cost.

STIMPLANTS Introductory Deal available from your Pfizer distributor: Clips of 10 pellets; each pellet contains 12 mg. of stilbestrol.

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(Chlorpromazine, S. K. F.)

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on outstanding record of clinical achievement in both large and small animals

- induces a state of unique tranquility without clouding consciousness or depressing mental faculties[1]
- potentiates local anesthetics[2]
- enhances the activity of analgesics and sedatives[3]
- controls nausea and vomiting[4]

Now available to veterinarians in these dosage forms:

2 cc. ampules containing 50 mg. 'Thorazine' in boxes of 6:
Tablets, 10 mg., in bottles of 50;
Tablets, 25 mg., in bottles of 50 and 500

Pitman-Moore Company is sole distributor of 'Thorazine' to the veterinary profession.

References: 1. Martin, J. E., and Beck, J. D.: Am. J. V. Res. 17: 678, 1956. 2. Troughton, S. E., Gould, G. N. and Anderson, J. A.: Veterinary Record 67: 903, 1955. 3. Brodey, R. S. and Thordal-Christensen, A.: J.A.V.M.A. 129: 410, 1956. 4. Estrada, E., to be published.

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DIVISION OF ALLIED LABORATORIES, INC., INDIANAPOLIS 6, INDIANA

CLINICAL USAGE OF

Thorazine

Dog

- For Hysterical, Nervous or Unfriendly Patients
- As an Aid in Medical Treatment (Restraint)
- In Surgery
  - Pre-anesthetic Usage as Replacement for Morphine
  - In Combination with General Anesthetics
  - Used Alone for Anesthesia
- Anti-emetic Effect
  - Prior to Anthelmintic Treatment
  - For Vomiting from Gastritis
  - For Vomiting from Pyometra
  - For Vomiting from Other Causes
- For Heat Stroke
- In Shock Due to Trauma
- For Fracture Reduction
- For Cough
- For Painful Conditions
  - General
  - Prolapsed Spinal Disc
  - Rheumatic Type
  - For Pain Associated with Otitis, Ocular Lesions or Wounds
- Aid in Breeding
- In Convulsive Patients

- Anti-diarrheal Effect
- Aid in Oral Medication
- Aid in Controlling Severe Pruritus
- In Obstetrics
- In Chorea Patients

Cat

- For Frightened or Unfriendly Patients
- In Surgery
- Aid in Hairball Therapy
- Anti-emetic Effect

Horse

- For Sedation
- In Tetanus Cases
- In Colic Cases
- In Surgery

Cattle

- For Sedation
- In Surgery
- To Relax Penis of Bull

Swine

- For Sedation

Goat

- For Sedation

Sheep

- For Sedation

From Table of Contents of Pitman-Moore's 'Thorazine', Laboratory and Clinical Reports. ***Write for your copy.***

—DEATHS OF VETERINARIANS—

August C. Luh, De Soto, Mo., KCV '17, Apr. 7, 1957.

R. B. McCord, North East, Pa., COR '13, Mar. 25, 1957.

Donald M. McDonald, Minneapolis, Minn., MCG '91, Feb. 15, 1957.

Allen J. Miller, Robertsdale, Ala., API '18, Mar. 7, 1957.

Edwin L. Miller, Houlton, Maine, ONT '18, Jan. 16, 1957.

Harry K. Miller, Mamaroneck, N. Y., NYC '91, Apr. 8, 1957.

Elbert H. Morris, Indianapolis, Ind., IND '18, Nov. 10, 1956.

John J. Morrow, Toronto, Ont., ONT '08, died recently.

Thomas Mosley, Lawton, Okla., CVC '20, died recently.

Irvin William Moynihan, Vancouver, B. C., ONT '36, Jan. 27, 1957.

Jacob M. Murray, Goff, Kans., KSC '08, died recently.

Albin Muskovin, Merrick, Long Island, N. Y., NYS '19, Jan. 1957.

Joseph Nicholson, Humboldt, Iowa, ONT '94, died recently.

Frank N. Niederwimer, Montgomery City, Mo., WES '08, died recently.

Albert G. Porter, Dyer, Tenn., TH '16, died recently.

Van A. Potes, Detroit, Mich., CVC '15, died recently.

Andrew S. Pyles, Wichita, Kans., KCV '01, Nov. 25, 1956.

Lonnie A. Ray, Colverdale, Ind., IND '12, died recently.

Roy V. Rafnel, Tallahasee, Fla., CIN '11, Apr. 2, 1957.

B. E. Robertson, Ocala, Fla., STJ '17, Jan. 17, 1957.

Thomas R. Robertson, Dyersburg, Tenn., MCK '16, died recently.

Fred E. Rugger, Oxford, Ia., ONT '14, Jan. 31, 1957.

Harry A. Schneider, Harrisburg, Pa., UP '06, died recently.

R. A. Shoemaker, Slater, Mo., died recently.

Charles A. Silverman, Mitchell, Nebr., COL '44, Feb. 12, 1957.

Col. James R. Shand, Palo Alto, Calif., CVC '07, Apr. 11, 1957.

Leslie E. Smith, Jefferson, Iowa, ISC '09 died recently.

Winslow A. Snyder, East Greenville, Pa., KVC '15, died recently.

Orville A. Stingley, Topeka, Kans., KCV '02, Jan. 27, 1957.

Clay E. Swisher, Cameron, W. Va., MCK '17, died recently.

Chauncey S. Underwood, Perry, Mo., KCV '15, died recently.

William C. Verploeg, Pella, Iowa, ICS '19, 1956.

James E. Walker, ONT '11, died recently.

W. W. Walker, Batesville, Ark., died recently.

George R. White, Nashville, Tenn., C '97, Mar. 1, 1957.

Alex E. Wight, Washington, D. C., HAR '97, March 11, 1957.

Bert R. Wilbur, COR '03, died recently.

Frand A. Wolfe, Linneus, Mo., KCV '10, died recently.

Theophilus J. Wood, Charlottesville, Va., USC '10, died recently.

Leonard B. Woods, Roodhouse, Ill., CVC '10, died recently.

Frederick A. Zucker, Union, N. J., AVC '96, Mar. 4, 1957.

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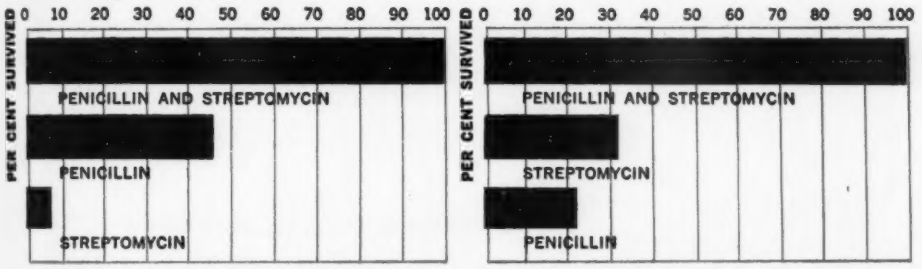

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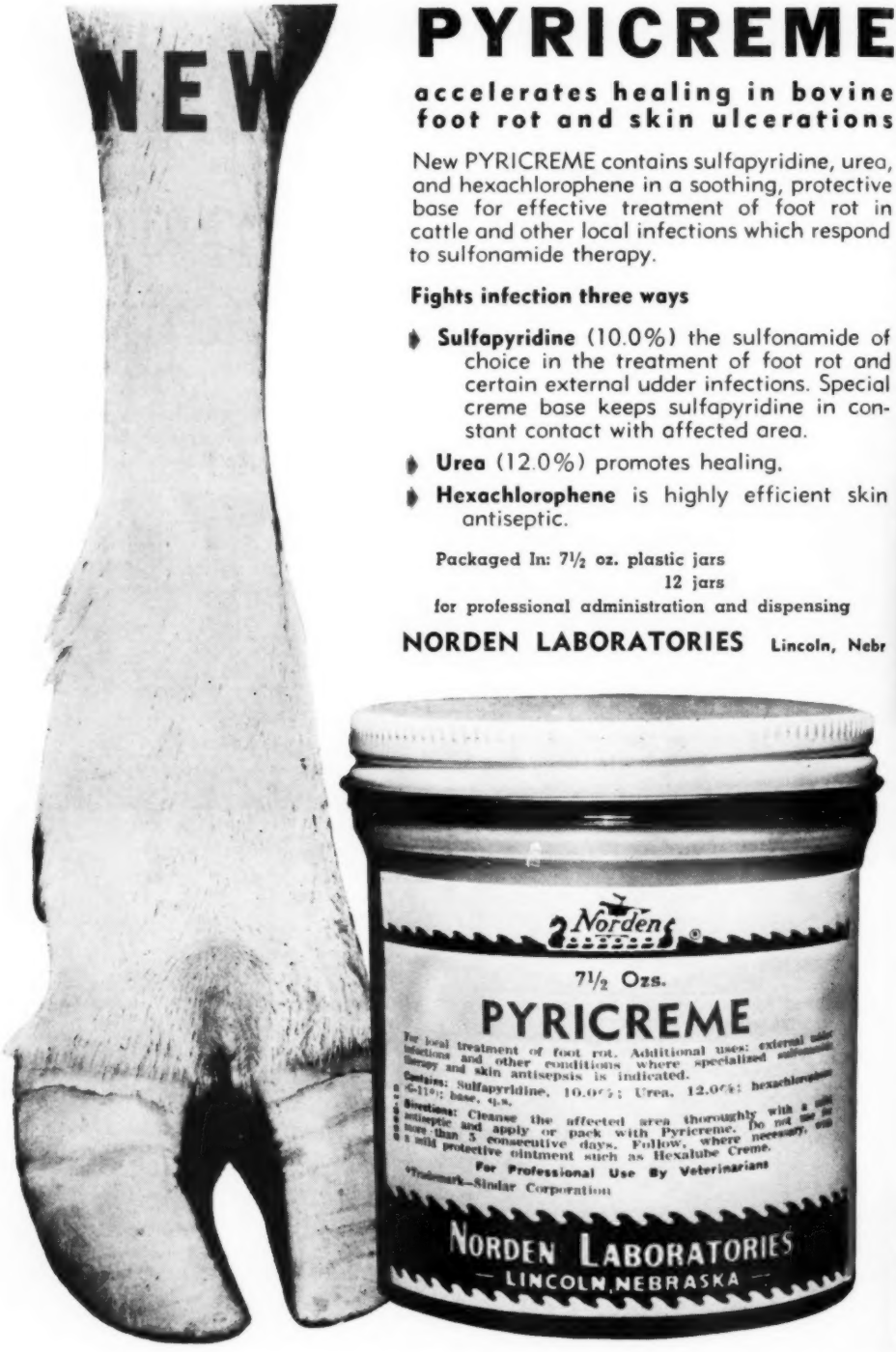
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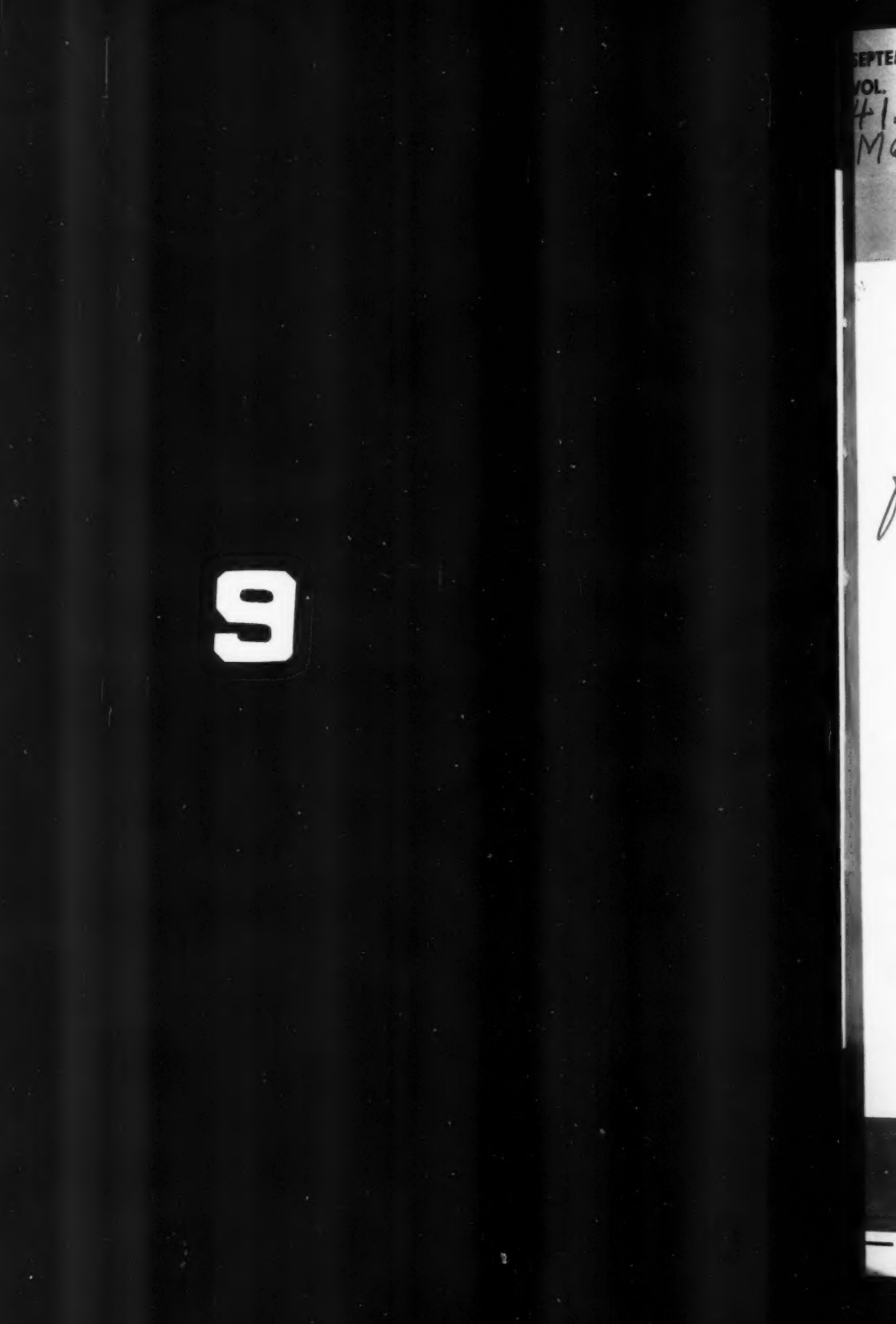
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